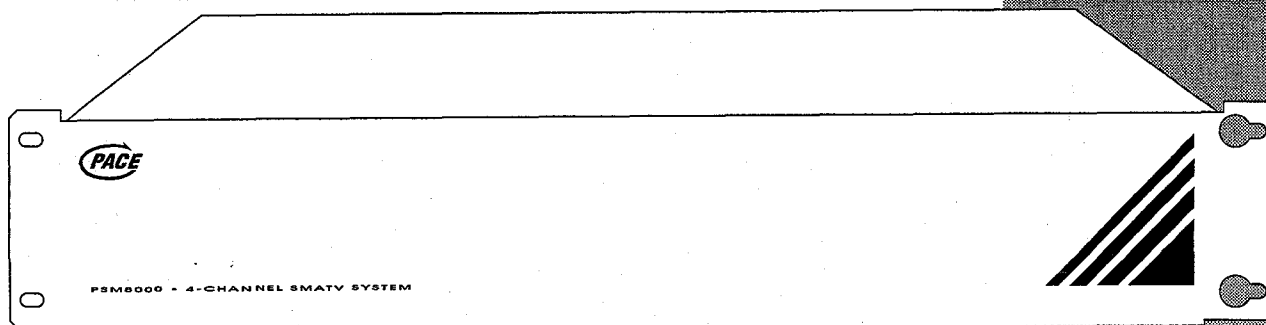


# Service Manual

PSM 8000 ■ SMATV SYSTEM



PSM  
8 0 0 0



# Contents

<b>TECHNICAL SPECIFICATION .....</b>	<b>3</b>
EXTERNAL DECODER SCART CONNECTIONS .....	4
PIN DESIGNATIONS .....	4
<b>SAFETY .....</b>	<b>5</b>
<b>CONNECTION TO THE MAINS SUPPLY .....</b>	<b>5</b>
Mains Lead Plug Connections (UK and Eire) .....	5
<b>SAFETY PRECAUTIONS .....</b>	<b>6</b>
GENERAL PRECAUTIONS .....	6
<b>SMATV SYSTEM BLOCK DIAGRAM .....</b>	<b>7</b>
<b>SMATV UNIT EXTERNAL COMPONENT IDENTIFICATION DIAGRAM .....</b>	<b>8</b>
<b>CONNECTING UP THE UNIT .....</b>	<b>9</b>
<b>POLARISATION OF THE INPUT SIGNALS .....</b>	<b>9</b>
<b>WALL MOUNTING DIAGRAM .....</b>	<b>10</b>
<b>RACK MOUNTING DIAGRAM .....</b>	<b>10</b>
<b>EQUIPMENT REQUIRED TO SET UP THE SMATV UNIT .....</b>	<b>11</b>
COLOUR MONITOR .....	11
HANDSET OVERVIEW .....	11
Keys Used in Menus .....	11
Changing the Batteries .....	12
<b>SMATV MENU STRUCTURE .....</b>	<b>13</b>
<b>SUMMARY OF MENU VALUES .....</b>	<b>14</b>
<b>IMPORTANT OPERATIONS .....</b>	<b>17</b>
<b>HANDLING ELECTROSTATIC SENSITIVE (ES) DEVICES .....</b>	<b>20</b>
<b>WORKING WITH CHIP COMPONENTS .....</b>	<b>20</b>
General Precautions for Handling and Storing Chips .....	20
General Precautions for Attaching and Removing Chips .....	20
Removing a Chip .....	20
Attaching a Chip .....	20
<b>GAINING ACCESS TO THE UNIT .....</b>	<b>21</b>
REMEMBER - SAFETY FIRST .....	21
Removing the Cover .....	21
Removing the Modulator Board .....	21
Removing the Main PCB .....	21
Re-assembling the Unit .....	21
<b>SMATV MODULATOR AND RECEIVER BLOCK DIAGRAMS .....</b>	<b>22</b>
<b>SMATV CIRCUIT DESCRIPTION .....</b>	<b>23</b>
<b>RECEIVER MOTHERBOARD .....</b>	<b>23</b>
TUNER AND VIDEO PROCESSING .....	23
Tuner .....	23
Video Processing Circuitry .....	23
Colour Graphics Generator .....	24
Audio Frequency Circuitry .....	24
CONTROL CIRCUITRY .....	25
U8 Extension PCB (OTP Board) .....	25
Replacement of the U8 Extension PCB by U8 Microprocessor .....	25
U8 EXTENSION (OTP BOARD) CIRCUIT DIAGRAM .....	26
U8 EXTENSION PCB (OTP BOARD) .....	27
SWITCH MODE POWER SUPPLY .....	28
Mains Input and Rectification .....	28
SMPS Controller U1 .....	28
Circuitry on Secondary Side of T2 .....	28
SMATV MODULATOR PCB .....	29
<b>SMATV PCB OSCILLOGRAMS .....</b>	<b>30</b>
<b>SPARES - PARTS LIST .....</b>	<b>35</b>
ELECTRICAL PARTS FOR MAIN BOARD .....	35
ELECTRICAL PARTS FOR OTP (Z8) BOARD .....	43
ELECTR. PARTS FOR MODULATOR BOARD (EMC VERSION) .....	43
<b>GRID REFERENCES - MOTHERBOARD CIRCUIT DIAGRAM 1 .....</b>	<b>47</b>
<b>GRID REFERENCES - MOTHERBOARD CIRCUIT DIAGRAM 2 .....</b>	<b>49</b>
<b>GRID REFERENCES - MOTHERBOARD PCB .....</b>	<b>50</b>
<b>GRID REFERENCES - MODULATOR CIRCUIT DIAGRAM .....</b>	<b>53</b>
<b>GRID REFERENCES - MODULATOR PCB .....</b>	<b>54</b>
<b>MODEL - SPECIFIC INFORMATION .....</b>	<b>55</b>
<b>LATE CHANGES .....</b>	<b>55</b>
Other Changes .....	55
<b>CIRCUIT DIAGRAMS AND ASSOCIATED PCB LAYOUTS .....</b>	<b>SEE ENCLOSED INSERTS</b>

## TECHNICAL SPECIFICATION

### Tuner

Input frequency	:	950 to 2050 MHz
Input signal level	:	-65 to -30 dBm per channel
Total input	:	-15 dBm max.
Channel bandwidth	:	27MHz standard or switchable 27/18 MHz or 27/36 MHz options (factory set)
LNB supply	:	fixed 18 V $\pm$ 0.5 V
Input return loss ratio (RLR)	:	10 dB
Local oscillator leakage	:	66 dB $\mu$ V max. (at F-type input)
Input impedance	:	75 $\Omega$
Static threshold	:	8 dB max.
EIRP	:	43 dBpW max.
Noise figure	:	12 dB max.

### Video

Video output level CVBS	:	1 V $\pm$ 10% into 75 $\Omega$
MAC baseband	:	250 mV p-p at crossover frequency (1.3 MHz)
External video input level	:	0.5 V to 1.5 V p-p
Differential gain	:	-10% min., +10% max. (10% to 90% APL, 4-step)
Differential phase	:	-20° min., +20° max. (10% to 90% APL, 4-step)

### Audio

Output level	:	500 mV rms into 600 $\Omega$
Total harmonic distortion (THD)	:	less than 2%
Signal to noise ratio	:	50 dB min. (unweighted)
Input level	:	500 mV rms into 600 $\Omega$ for full subcarrier deviation ( <i>excess input will be clipped to prevent overmodulation onset of clipping 500 - 600 mV rms</i> )

### UHF Remodulated Output

Modulation scheme	:	negative modulation, double sideband
Output frequency	:	any CCIR channel (21 to 69 with 8 MHz channel spacing) or adjustment in 250 kHz steps using software fine tune facility.
Output level	:	-15 dBm per channel (+94 dB $\mu$ V)
Output return loss ratio (RLR)	:	6 dB min.
Spurious output	:	approved to Standard VDE 0855 Part 10
Sound subcarrier	:	optional — 5.5 MHz $\pm$ 15 kHz (PAL G) or 6.0 MHz $\pm$ 15 kHz (PAL I) or 6.5 MHz $\pm$ 15 kHz (PAL K) (factory set)

### Power Supply

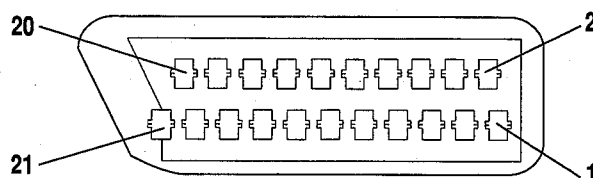
Line input	:	187 to 264 V AC 50 Hz
Power	:	45 W max.
LNB output	:	+18 V 400 mA max., short circuit protected and series diode protection

### Operating/Storage Conditions

Operating temperature range	:	+5 °C to +40 °C
Operating relative humidity range	:	20% to 80% non-condensing at 25 °C
Storage temperature range	:	-20 °C to +70 °C
Storage relative humidity range	:	10% to 90% non-condensing

## EXTERNAL DECODER SCART CONNECTIONS

Socket Viewed from Rear Panel



### PIN DESIGNATIONS

PIN	DECODER SCART
1.	RIGHT audio output
2.	RIGHT audio input
3.	LEFT audio output
4.	Audio ground
5.	Ground
6.	LEFT audio input
7.	N/C
8.	External Decoder status input
9.	Ground
10.	N/C
11.	N/C
12.	Serial data I/O port
13.	Ground
14.	N/C
15.	N/C
16.	N/C
17.	Video ground
18.	Ground
19.	Baseband video output
20.	Baseband video input
21.	Ground (casing)



## SAFETY

This decoder has been designed and built in the UK to provide years of trouble-free service. The decoder has been manufactured to meet international safety standards but, as with any electrical equipment, care must be taken if you want to obtain the best results and operate the decoder safely.

To obtain the best results from this decoder, it is important that you read this manual completely, especially the safety instructions below.

## CONNECTION TO THE MAINS SUPPLY

This apparatus operates within the range of 220-240 V AC, 50 Hz mains supplies. DO NOT CONNECT IT TO DC MAINS. The lead is supplied terminated at one end with a connector to be inserted into the mains input socket on the rear panel of the apparatus.

### Mains Lead Plug Connections (UK and Eire)

The mains lead supplied may or may not have a non-rewireable (moulded) plug. Please see the section marked with an asterisk (\*) if the supplied mains lead does not have a non-rewireable plug fitted.

Mains leads fitted with a non-rewireable (moulded) plug incorporate a fuse, the value of which is indicated on the pin face of the plug. Should the fuse need to be replaced, an ASTA or BSI approved BS 1362 fuse must be used of the same rating, the marking on the device should be as shown below.



If the fuse cover is detachable always refit the cover after replacing the fuse. NEVER use the plug with the fuse cover omitted.

If the fitted plug is not suitable for the users socket outlets it should be cut off, after having first removed the fuse, and an appropriate plug fitted in its place. If this new plug contains a fuse its value should be the same as that removed from the non-rewireable plug.

The severed plug must be destroyed immediately to avoid the possible shock hazard should it be inserted into a 13A socket elsewhere.

### \*IF YOU NEED TO FIT A MAINS PLUG THEN FOLLOW THE INSTRUCTIONS GIVEN BELOW:

**Important:** The wires in the mains lead are coloured in accordance with the following code:

**BLUE** - Neutral (N)

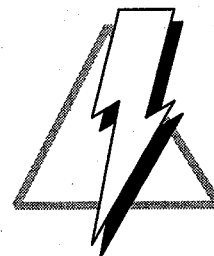
**BROWN** - Live (L)

As these colours may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

The wire coloured BLUE must be connected to the terminal marked with the letter N or coloured BLUE or BLACK. The wire coloured BROWN must be connected to the terminal marked with the letter L or coloured BROWN or RED. On no account connect either of these wires to the terminal marked E or coloured GREEN or GREEN and YELLOW.

Before replacing the plug cover, make certain that the cord grip is clamped over the sheath of the lead; not simply over the two wires.

A fused plug must be fitted with a 3 A fuse complying with BS 1362. If you are using a non-fused plug, an external fuse must not exceed 5 A.



## SAFETY PRECAUTIONS

**WARNING:** Do not power up the unit until all the cables have been connected.

**NOTE:** Drawings in this manual show a 2-pin moulded plug, which is standard in most countries except the UK. For the UK, you must use a 3-pin plug incorporating a 3A fuse complying with BS1362. See the preceding page.

## GENERAL PRECAUTIONS

### •REMEMBER SAFETY FIRST•

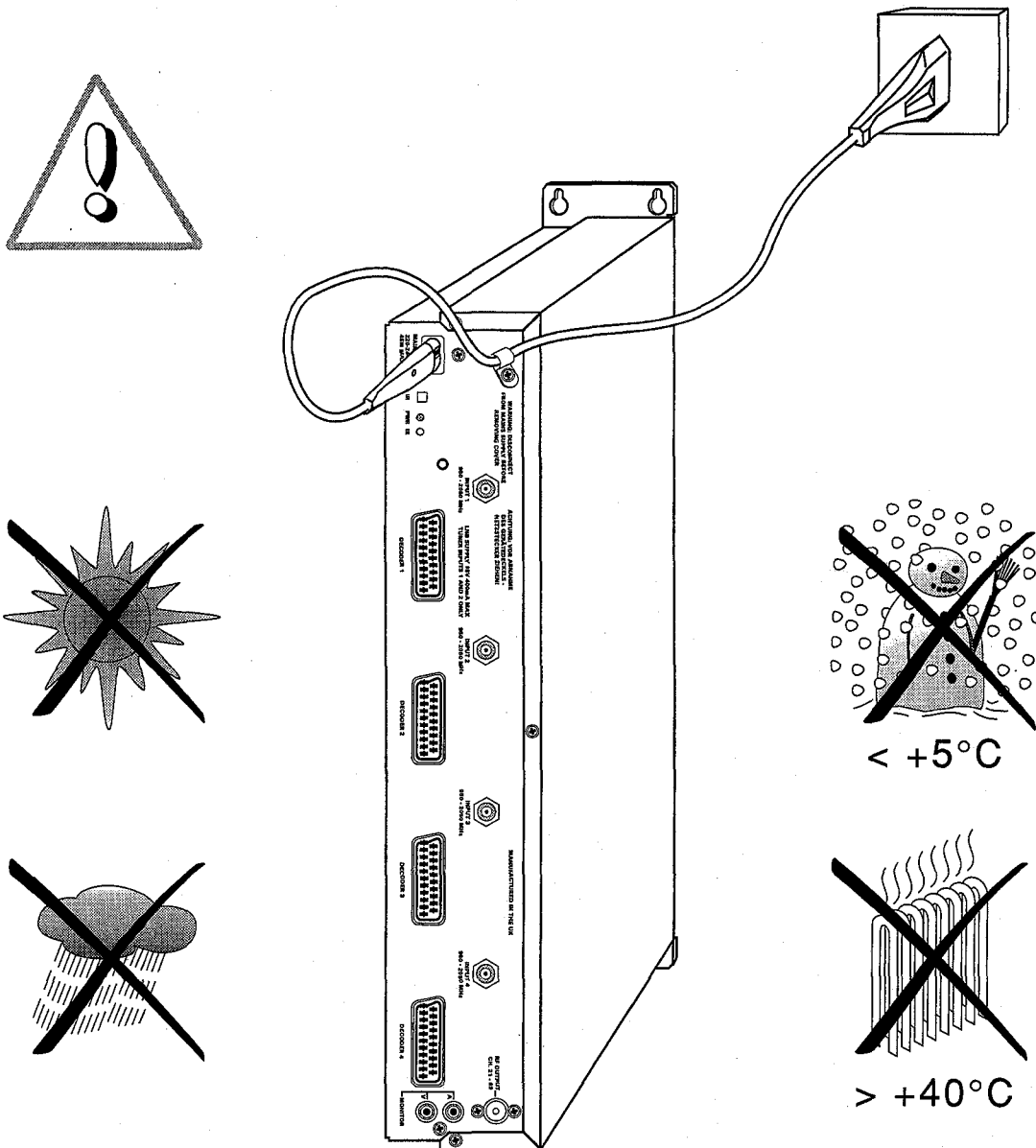
Always disconnect the unit from the mains supply before removing or re-installing any component, circuit board, module or any part of the assembly.

Before switching the unit on always confirm that the voltage rating label on the back of the unit matches the voltage for your country.

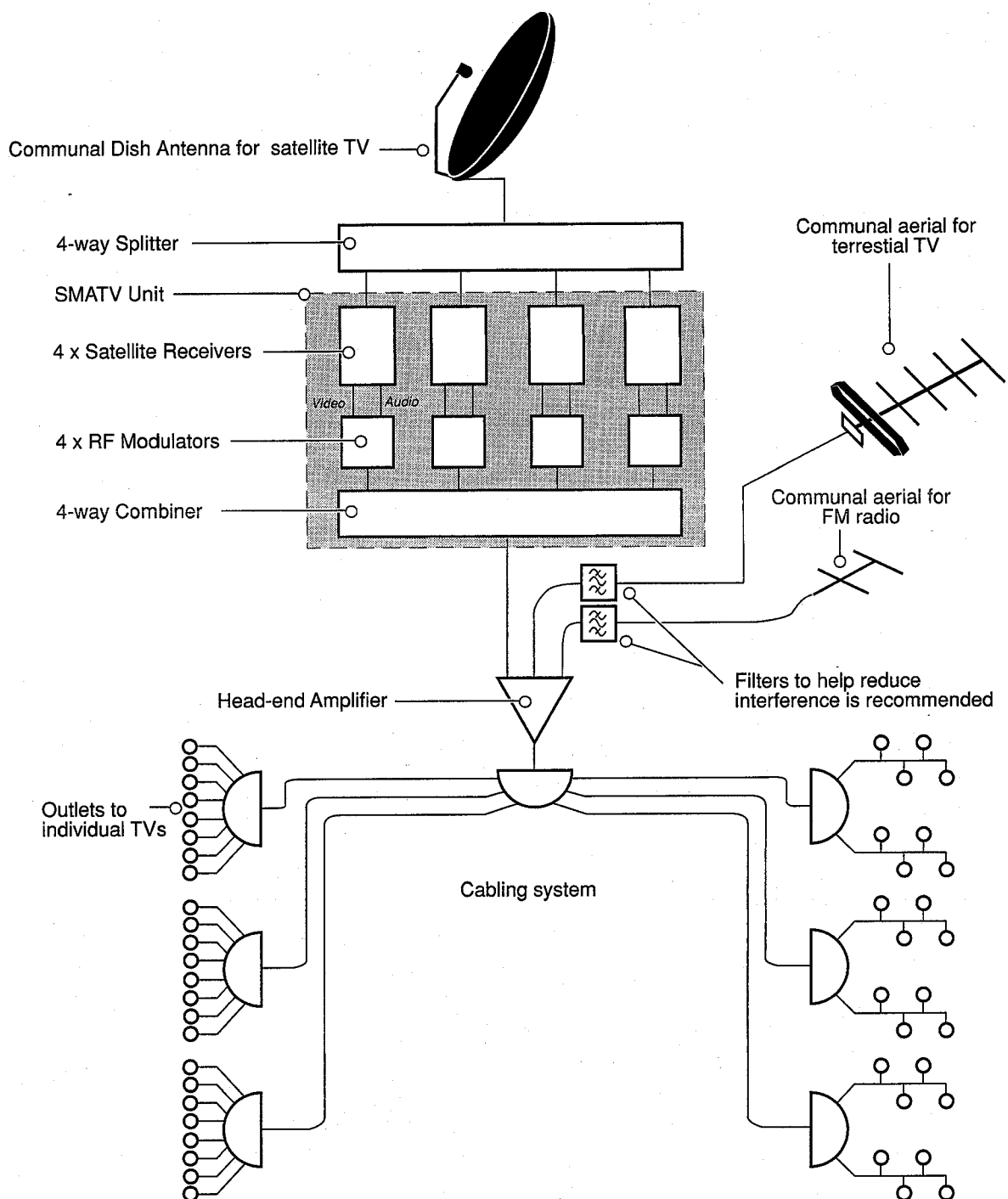
Do not spray any chemicals on or near the unit.

Faulty components must be replaced with the correct value and rated component by a competent engineer. Failure to do so could invalidate safety approvals.

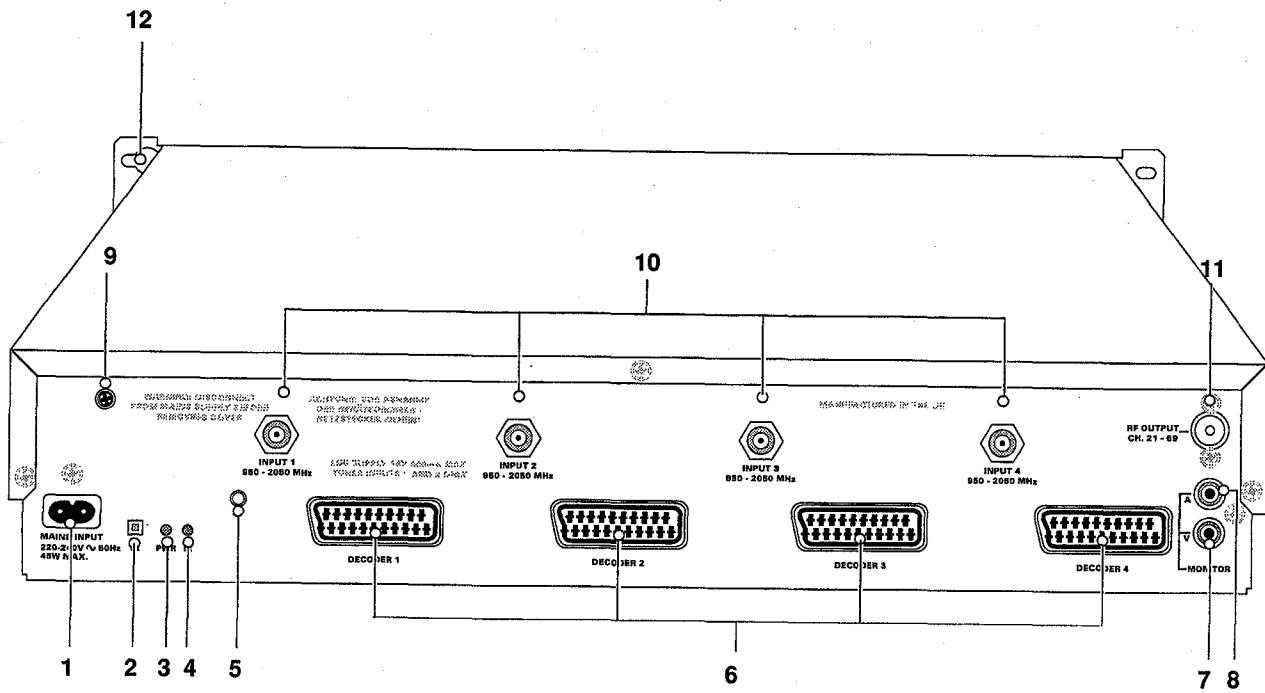
**CAUTION:** Wrong substitution of electrolytic capacitors may result in an explosion hazard.



# SMATV SYSTEM BLOCK DIAGRAM



## SMATV UNIT EXTERNAL COMPONENT IDENTIFICATION DIAGRAM

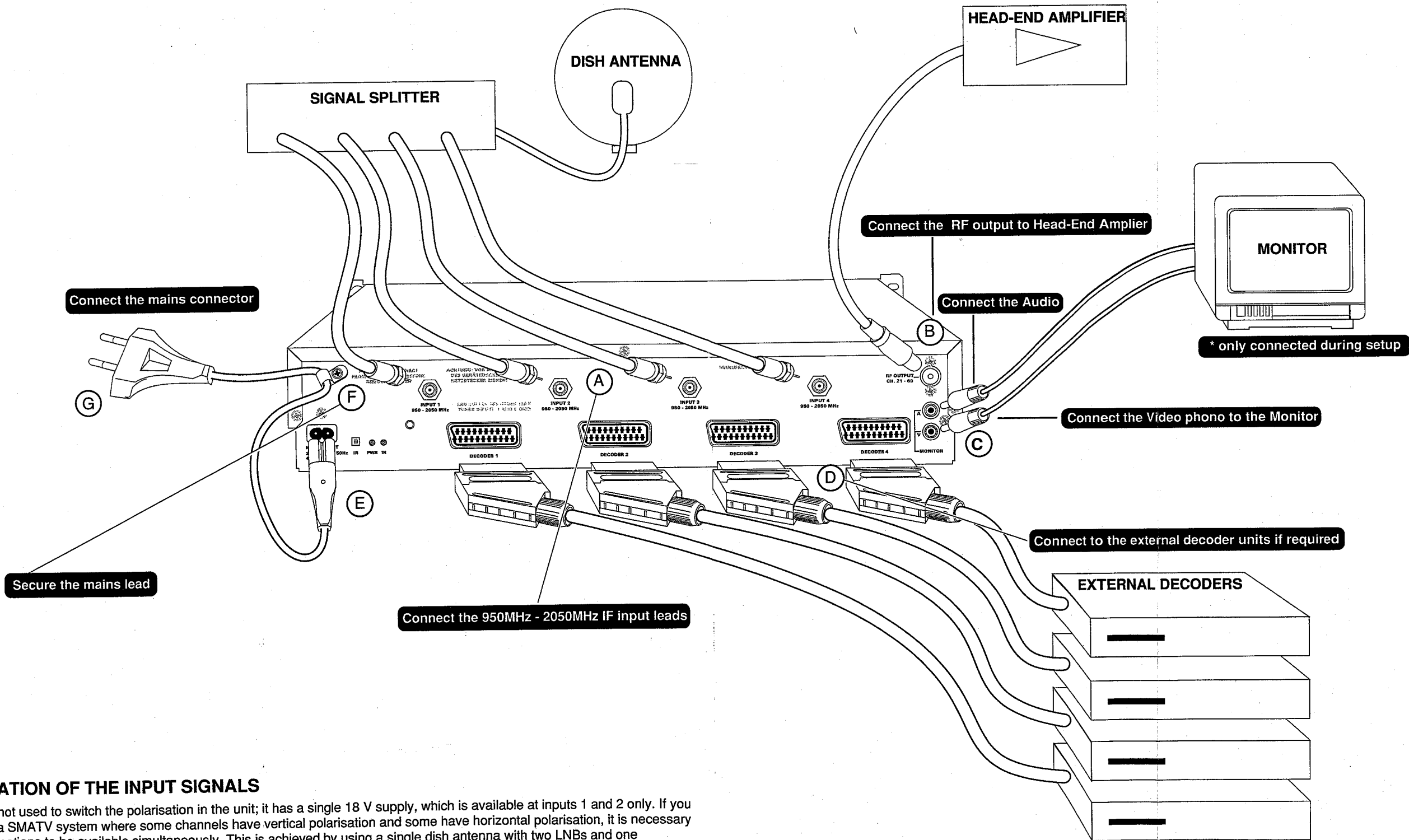


1. MAINS INPUT — IEC mains input connector.
2. IR — On/Off toggle for Infra Red control.
3. PWR — Power is on when green LED illuminated.
4. IR — IR control is enabled when green LED is illuminated; LED blinks when IR beam is being received.
5. IR sensor window.
6. DECODER 1 to 4 — SCART connectors for connecting external decoders to the SMATV unit.
7. V MONITOR — Video phono connector for connecting to a monitor.
8. A MONITOR — Audio phono connector for connecting to a monitor.
9. Screw for attaching mains lead to P-clip.
10. INPUT 1 to 4 — F-type connectors for LNB inputs to tuners, only INPUT 1 and INPUT 2 have 18V power on them.
11. RF OUTPUT — IEC connector for RF output to the communal system.
12. Connection lugs for securing the unit to either wall or rack mounting facility.

CONNECTING UP THE UNIT

WARNING: Do not power up the unit until all the cables have been connected.

SUGGESTED ORDER OF CONNECTING UP TO THE PERIPHERAL UNITS OF THE COMMUNAL SYSTEM

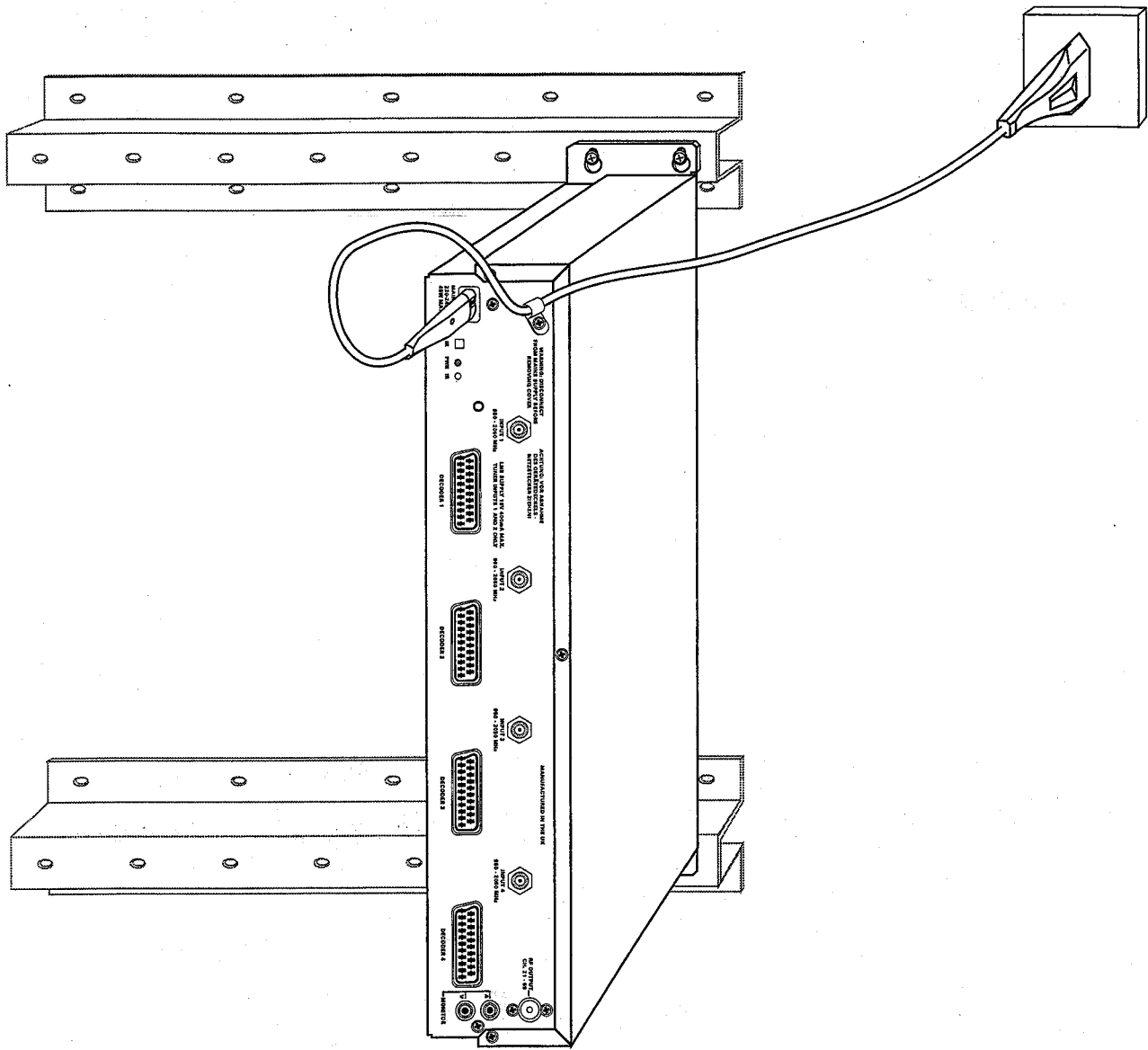


POLARISATION OF THE INPUT SIGNALS

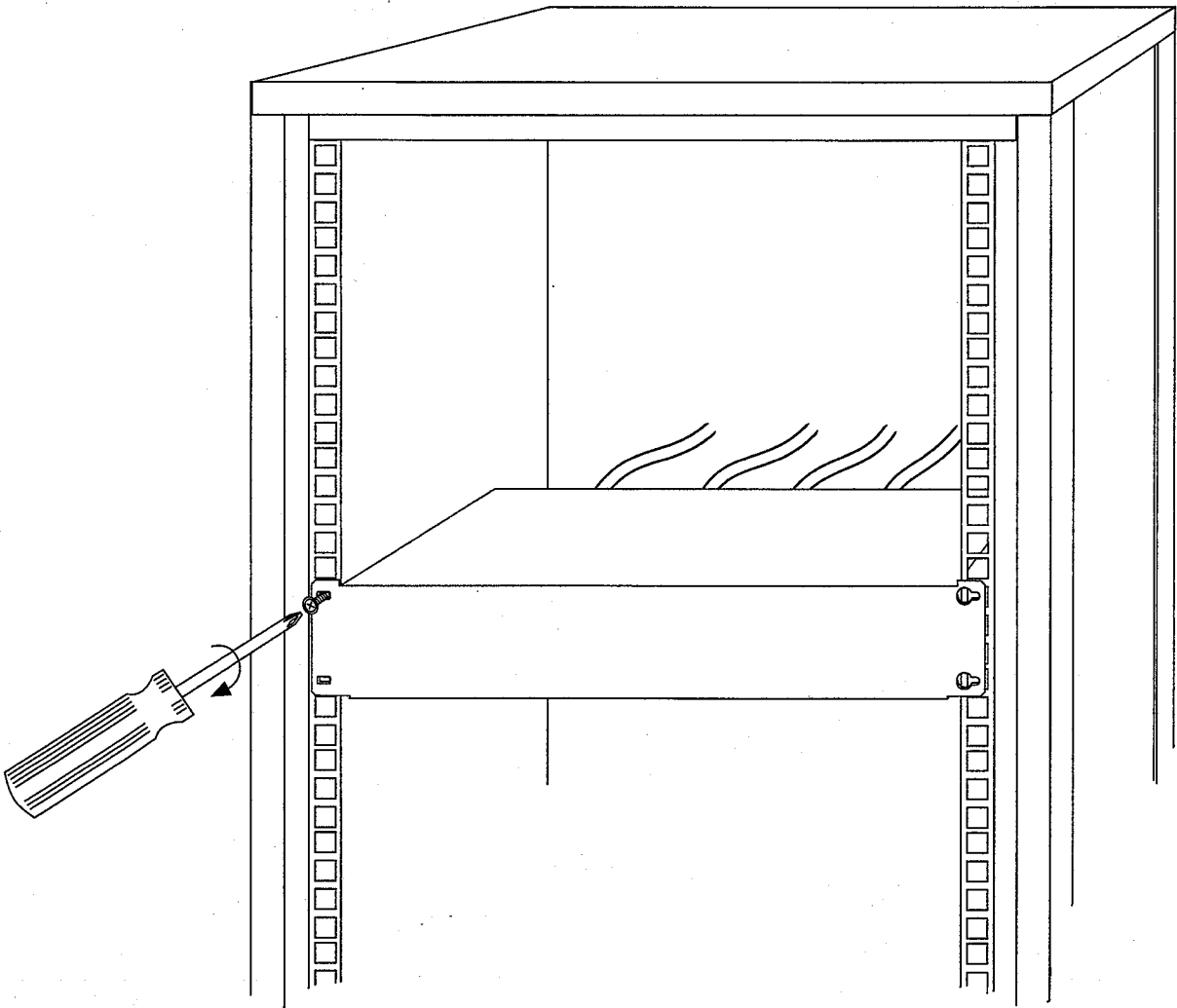
As voltage is not used to switch the polarisation in the unit; it has a single 18 V supply, which is available at inputs 1 and 2 only. If you are installing a SMATV system where some channels have vertical polarisation and some have horizontal polarisation, it is necessary for both polarisations to be available simultaneously. This is achieved by using a single dish antenna with two LNBs and one orthomode transducer (which accurately splits the horizontal and vertical polarisations) or a high quality dual LNB. The polarisation of the signal into each of the 4 inputs is chosen by connecting the appropriate cable from the signal splitters.

**NOTE:** For a less flexible system you could use two 2-way splitters, in which case two inputs would be for vertically polarised channels and two for horizontally polarised channels.

WALL MOUNTING DIAGRAM

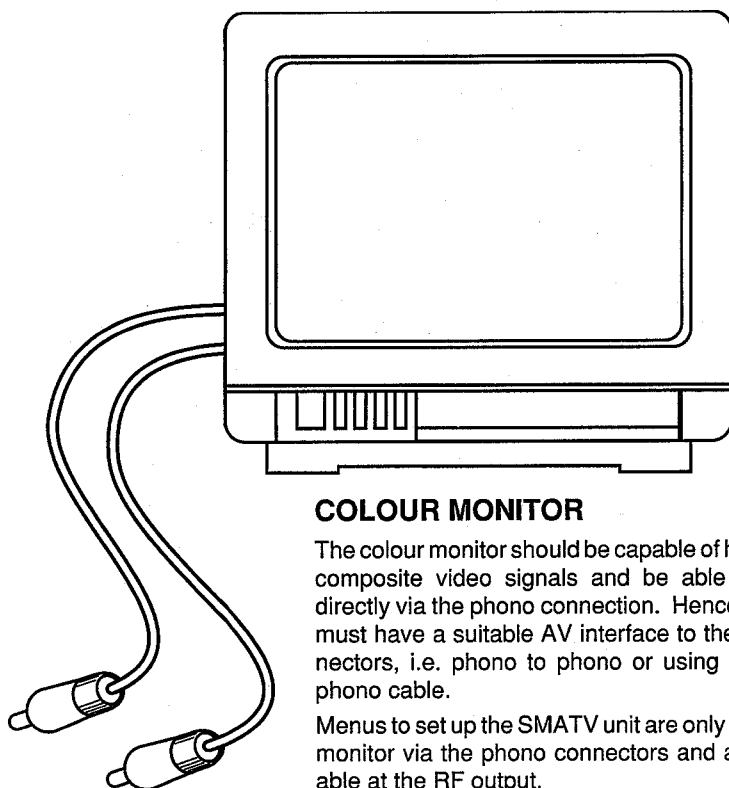


RACK MOUNTING DIAGRAM



**NOTE:** Leave 1U (44.45 mm) of space between rack-mounted units.

## EQUIPMENT REQUIRED TO SET UP THE SMATV UNIT



### COLOUR MONITOR

The colour monitor should be capable of handling PAL composite video signals and be able to interface directly via the phono connection. Hence the monitor must have a suitable AV interface to the phono connectors, i.e. phono to phono or using a SCART to phono cable.

Menus to set up the SMATV unit are only visible on the monitor via the phono connectors and are not available at the RF output.

### HANDSET OVERVIEW

The handset has a protective film on its top surface, around the keys. You can peel this off, if you wish. All operational keys are shaded grey in the diagram opposite.

The handset works by sending an infra-red beam to your SMATV unit, therefore be sure to point it towards the infra-red receiver window located on the rear of the SMATV unit. See item 5 of the external component identification diagram page 8.

Do not place any objects in infra-red beams path which may inadvertently block the beam between the infra-red window and the handset. For the user to operate the handset the 'IR' enable toggle switch located on the rear of the unit must first be pressed, resulting in the 'IR' status LED becoming illuminated. When the handset keys are operated the 'IR' status LED blinks, acknowledging that the beam of infra-red data is been received.

If the user does not operate the handset keyboard within a given time period the unit times out and the 'IR' status LED will extinguish. If this happens then the 'IR' enable toggle switch will require pressing once again.

On completing the handset setting up operations, the 'IR' toggle switch can be pressed resulting in the infra-red sensor being deactivated and the 'IR' status LED will become extinguished.

### Keys Used in Menus

**MENU key:**

used to enter the Main Menu, i.e. display it on the monitor screen; can be used to move back to the previous menu in the menu structure

**0 - 9 keys:**

used to move down to the next menu in the menu structure; used to select an option in the menu; used to enter the PIN.

**▲ key:**

used to move up through the options within a menu

**▼ key:**

used to move down through the options within a menu

**◀ and ▶ keys:**

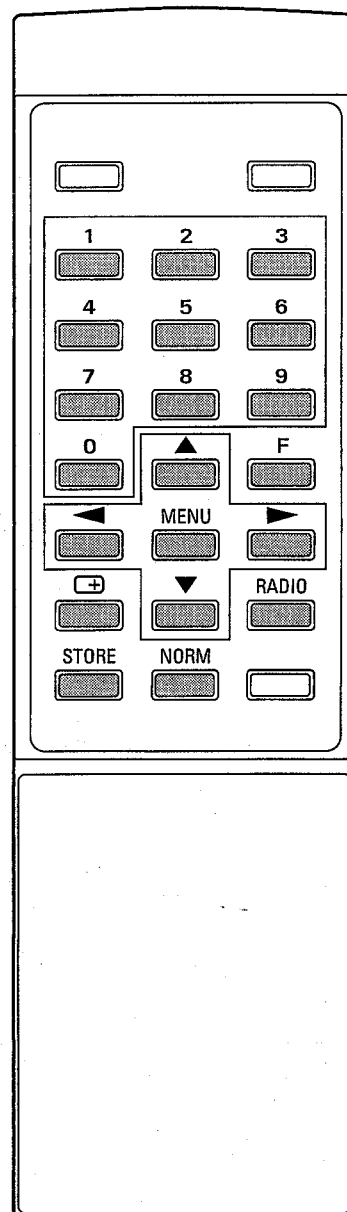
used to select the values of each option in the menus;

**F key:**

used to start certain actions in the menus

**[+] key:**

this is the status key, which, in menus, is used to display the channel status on screen for 5 seconds.



**NORM** key: used to leave a menu without storing any of the information you may have just altered in that menu; the receiver returns to normal viewing mode

**STORE** key: used to store information you have just altered in a menu, so that this information becomes valid, and will be visible when that menu is re-entered

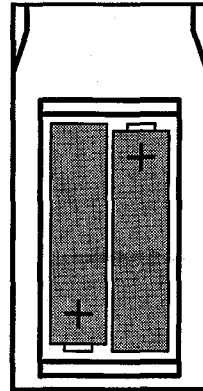
*NOTE: The ▲, ▼, ◀ and ▶ keys all cause a "wrap" (e.g. pressing the ▼ key at the last option in a menu will select the first option, or if the possible values are 1, 2 and 3, and you keep pressing the ▶ key, 1, 2, 3, 1, 2....etc will be displayed).*

### Changing the Batteries

The handset runs from two AA batteries located under a cover on the underside of the handset. These batteries will need replacing from time to time. You should do this as soon as the handset fails to operate the SMATV unit from the normal testing distance.

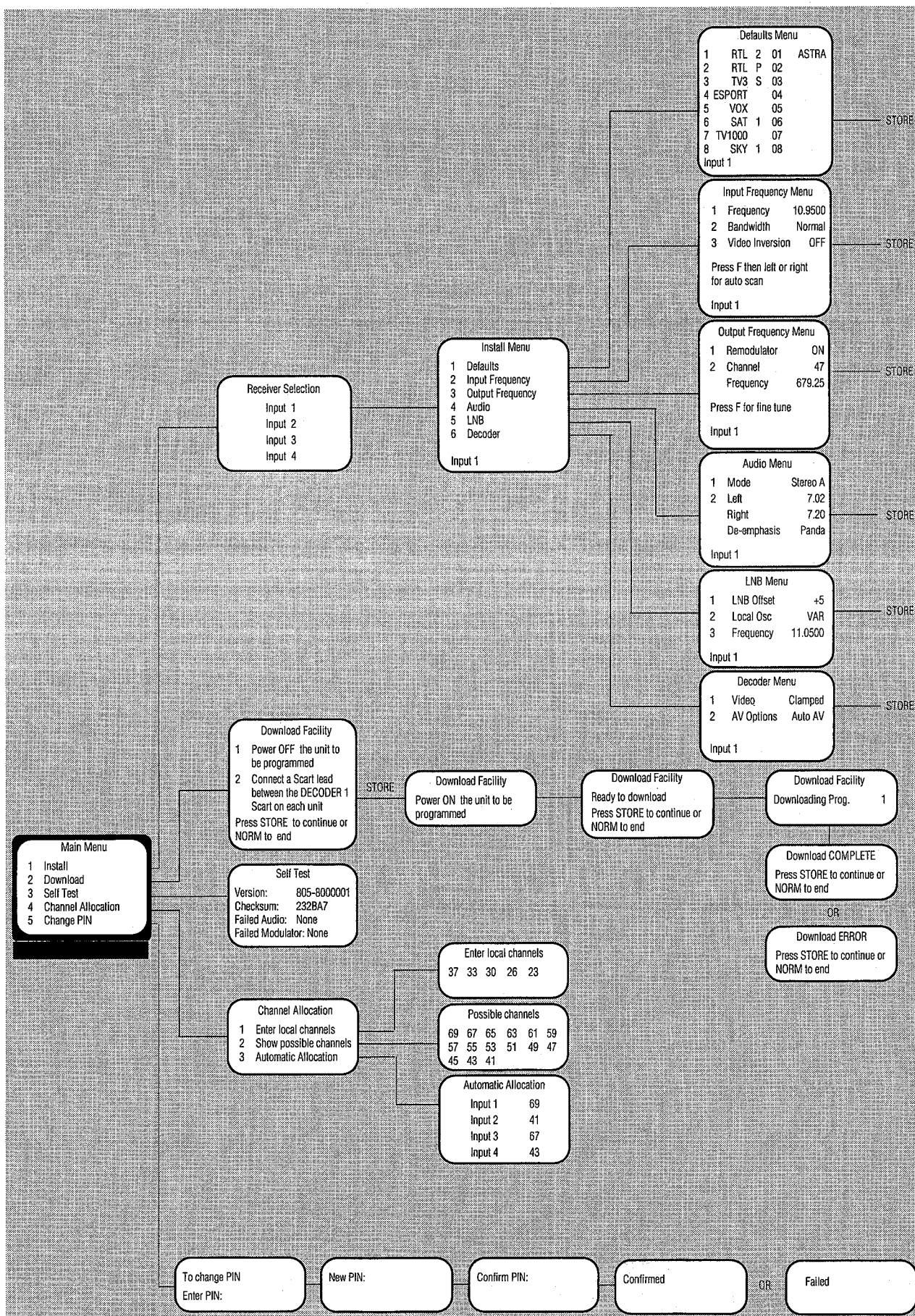
Pressing down slightly on the ridged part of the battery cover, slide the cover in the direction marked ▼ OPEN. Remove the old batteries and put in the new ones in the orientation shown in the figure. Slide the cover back into position.

*NOTE: Never leave flat batteries in the handset, as they may leak and corrode the metal contacts.*





# SMATV MENU STRUCTURE



## SUMMARY OF MENU VALUES

### IMPORTANT:

- The Main Menu is used for progressing into the menu structure. From this menu you can open up various sub-menus, all of which are concerned with setting up individual functions on the SMATV unit.
- You will need to use the Channel Allocation Menu to tune in the desired satellite channels to UHF channels around the terrestrial channels previously tuned in.
- If you leave any of these menus by pressing the MENU key (so that you stay in the menu structure), any information you have changed at the menus will not necessarily be lost. It can be stored when the STORE key is pressed in a different menu.
- Press the STORE key to store these settings.

The functions of the SMATV unit are set up using on-screen menus which are contained in a menu structure spreading out from a Main Menu. As previously described the user is required to press the 'IR' enable toggle switch before being able to operate the handset, this results in the 'IR' status LED becoming illuminated. Where multiple units are being used, only activate the 'IR' enable toggle switch of the unit being set up. Toggling the 'IR' switch results in the Enter PIN message appearing on the monitor screen as shown right.

Entering the correct PIN number allocated to the unit results in the Main Menu appearing on the screen as shown right. If, however, the incorrect PIN number is keyed in then a message Invalid Pin will appear on the screen and the process will require repeating from start. For users that have forgotten their PIN number a factory default PIN = 1234 is made available.

#### Main Menu :-

*Install Menu Option* : Pressing key '1' of the handset results in Receiver Selection sub-menu appearing on the screen as shown right.

#### Receiver Selection :-

*Input 1 to Input 4* : Represents the four receivers within a single SMATV unit. Pressing the desired numeric key enables the operator to set up that particular receiver via the Install Menu that appears.

#### Install Menu :-

*Defaults Menu* : There are eight possible choices displayed on the menu at one time, the specific choice for the receiver being set up can be made using the numeric keys 1 - 8.  
If the programme channel required is not available a further selection of programme channels can be made possible by pressing the ▲ or ▼ keys. Pressing the STORE key will save the desired programme channel.

*Input Frequency Menu* : Used when setting up the receiver to a known programme channel not in the default listing and if specific enhancements to the bandwidth or video inversion on C-Band transmissions are required.

Option 1: Results in the 'Frequency' value (in GHz) flashing. If the desired value is below or above the displayed value then press the ◀ ▶ key respectively until the correct value appears. If preferred use the numeric keys to put in the known programme channel frequency value.  
Alternatively by pressing the F and the ◀ ▶ key the 'auto-scan' facility can be initiated. This results in a decrease or increase in frequency in 500kHz steps taking place until the desired frequency is found, to stop the scan press the Menu key. If necessary, fine tuning can be obtained by pressing the ◀ ▶ key.

Enter Pin

#### Main Menu

- 1 Install
- 2 Download
- 3 Self Test
- 4 Channel Allocation
- 5 Change Pin

#### Receiver Selection

Input 1  
Input 2  
Input 3  
Input 4

#### Defaults Menu

1	RTL	2	01	ASTRA
2	RTL	P	02	
3	TV3	S	03	
4	ESPORT		04	
5	VOX		05	
6	SAT	1	06	
7	TV1000		07	
8	SKY	1	08	

Input 1

#### Input Frequency Menu

1	Frequency	10.9500
2	Bandwidth	Normal
3	Video Inversion	OFF

Press F then left or right  
for auto scan

Input 1

Option 2 : Results in the 'Bandwidth' value flashing. Press the ◀▶ key respectively until the desired value appears. The options of bandwidth available depends on the type of tuner fitted to the SMATV unit. e.g. NORMAL (27MHz) and NARROW (18MHz), NORMAL and WIDE (36MHz) or just NORMAL. Setting the narrower of the two option values available may reduce sparklies.

Option 3 : Results in the 'Video Inversion' value flashing. Generally this option should be OFF (the default value). Some bands have inverse video (e.g. C-Band) where this is the case the option should be ON.

Press the ◀▶ key respectively until the desired requirement of ON or OFF is selected.

(If CBAND is set in the LNB Menu, this video inversion option will automatically set itself to ON.)

Pressing the STORE key will save the desired settings.

**Output Frequency Menu :** Basically this option allows the user to control whether the modulator is in circuit or out of circuit. Hence, if only 3 out of 4 channels were required then the modulator not required could be switched off thereby reducing the chance of interference to the 3 desired channels.

Option 1: Remodulator — used to allow/prevent the signal from the receiver to reach the RF output by switching the Modulator ON/OFF respectively.

Option 2: Channel — used to decrease or increase the channel selection in single steps. Press the ◀ or ▶ key respectively to step through the range of channel values 21 – 69.

Frequency — used to decrease or increase the frequency in 8MHz steps. Press the ◀▶ key respectively to step through the range of output frequency values 471.25 – 855.25MHz.

#### Output Frequency Menu

1	Remodulator	ON
2	Channel	47
	Frequency	679.25

Press F for fine tune

Input 1

#### Audio Menu

: Used to set the audio reception to the appropriate subcarrier for the desired programme channel being set up.

Option 1: Mode — Available values are Mono 1 - 9 and Stereo A - D. Note however, Audio modes Stereo A to Stereo D are received in stereo and then the left and right audio channels are added together to give a mono output. A full list of default values is shown below.

Press the ◀▶ keys to step through the default modes.

Option 2: Left and Right — Available values are 5.00 - 9.00 (MHz). This is used to customise the frequency (this gives Mono V (V for variable) and Stereo V at option 1). Press the ◀▶ keys to step through in 10kHz steps or the numeric keys for direct entry.

Option 3: De-emphasis — this option is only available as a variable to be set up as desired in Mono mode, i.e. 50µs or J17.

In Stereo mode the de-emphasis changes automatically to being part of Option 2 and becomes a fixed value, i.e. Panda.

#### Audio Menu

1	Mode	Stereo A
2	Left	7.02
	Right	7.20
	De-emphasis	Panda

Input 1

In any menu, pressing the RADIO key will allow you to step through the default modes. These modes are shown in the following list. Some of the modes are satellite radio channels; others provide TV commentary in different languages.

### FSS

Stereo A	7,02 + 7,20 MHz	Panda 1
Stereo B	7,38 + 7,56 MHz	Panda 1
Stereo C	7,74 + 7,92 MHz	Panda 1
Stereo D	8,10 + 8,28 MHz	Panda 1
Mono 1	6,50 MHz	50µs
Mono 2	7,02 MHz	Panda 1
Mono 3	7,20 MHz	Panda 1
Mono 4	7,38 MHz	Panda 1
Mono 5	7,56 MHz	Panda 1
Mono 6	7,74 MHz	Panda 1
Mono 7	7,92 MHz	Panda 1
Mono 8	8,10 MHz	Panda 1
Mono 9	8,28 MHz	Panda 1

### CBAND

Stereo A	5,58 + 5,76 MHz	Panda 1
Stereo B	5,94 + 6,12 MHz	Panda 1
Stereo C	6,30 + 6,48 MHz	Panda 1
Stereo D	6,66 + 6,84 MHz	Panda 1
Mono 1	6,60 MHz	50 µs
Mono 2	6,65 MHz	50 µs
Mono 3	6,80 MHz	50 µs
Mono 4	5,94 MHz	Panda 1
Mono 5	6,12 MHz	Panda 1
Mono 6	6,30 MHz	Panda 1
Mono 7	6,48 MHz	Panda 1
Mono 8	6,66 MHz	Panda 1
Mono 9	6,84 MHz	Panda 1

Pressing the STORE key will save the desired settings.

### LNB Menu

: This menu is used to correct for LNB local oscillator frequency variations if the desired programme channel is slightly off tune.

Option 1: LNB Offset — used to correct for variations in the LNB output frequency and therefore to make the picture as 'sparkly-free' as possible. Available values are -15 to +15 (MHz), the zero offset value (the default) = None.

Option 2 : Local Osc — Available values are FSS, DBS, T-COM, CBAND or VAR. Used to set the appropriate band for the LNB used. If incorrectly set, the frequency option in the Input Frequency Menu will show the wrong value for the satellite channel currently displayed.

Setting	Freq. Range (GHz)	Typical Satellite
FSS	10.9500 - 12.1000	Astra
DBS	11.7000 - 12.8500	TDF/TVSAT/HISPASAT
T-COM	12.4250 - 12.5750	
CBAND	3.0500 - 4.2000	

Option 3 : Frequency — Available values are 9.5000 to 19.0000 (GHz). VAR causes this third option to appear on the menu, where the LNB frequency can be customised using the numeric keys for direct entry of the frequency value (default = 9500)

Pressing the STORE key will save the desired settings.

#### LNB Menu

1	LNB Offset	+5
2	Local Osc	VAR
3	Frequency	11.0500

Input 1

## Decoder Menu

: This menu is used to software control external decoder AV signals that are required for the desired programme channel.

Option 1: Video — available values are Clamped or Unclamped. Clamped being filtered, clamped PAL (used with line cut and rotate scrambling systems e.g. VideoCrypt, Nagravision). Unclamped being raw baseband (used with MAC decoders and sync. suppression scrambling systems).

Option 2: AV Options — available values are Auto AV, Ext AV or Ext Video.

Auto AV = automatic loop-through to the receiver modulator prior to RF output; loop-through is enabled when the decoder asserts a voltage >6 V on pin 8 of the allied receivers DECODER SCART connector. i.e., DECODER 1 and Receiver 1 of the SMATV unit.

Ext AV = forced loop-through of video only.

If the setting is Ext AV or Ext Video there will be no TV picture if there is no attached decoder.

Pressing the STORE key will save the desired settings.

Pressing the MENU key repeatedly will return you to the Main Menu.

**Decoder Menu**

1	Video	Clamped
2	AV Options	Auto AV

Input 1

## IMPORTANT OPERATIONS

### Main Menu :-

#### Download

: Pressing key '2' of the handset results in the Download Facility sub-menu appearing on the screen as shown right.

**NOTE:** The downloading procedure can only be carried out by connecting the host receiver Decoder 1 SCART to the guest receiver Decoder 1 SCART.

### Download Facility :-

#### Option 1 & 2

: This menu is used to transfer the software information from one SMATV unit to other units in a multiple system. The connections between the units is shown below, refer to the Installation Manual for further information if required.

Pressing the NORM key will end the downloading when the Download COMPLETE message appears.

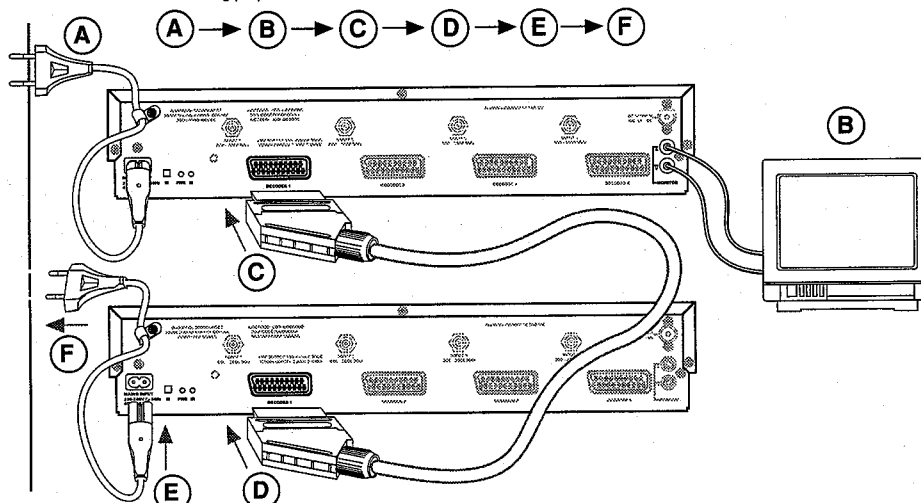
Pressing the MENU key repeatedly will return you to the Main Menu.

**Download Facility**

- 1 Power OFF the unit to be programmed
- 2 Connect a Scart lead between the DECODER 1 Scart on each unit

Press STORE to continue or NORM to end

NOTE : For downloading purposes it is recommended that you connect the SMATV units in order as shown



## Main Menu :-

### Self Test

: Pressing key '3' of the handset results in the Self Test sub-menu appearing on the screen as shown right.

### Self Test Menu

: The messages on the screen indicate:-

- the version of software used.
- checks the bytes used in hexadecimal indicating, if incorrect, EEPROM failure.

Further tests are whether any faults are apparent in the audio and modulator circuits of all four receivers. This is in brief is done by the Microprocessor using interrogating and response techniques (handshaking) between the audio circuit processors and the modulator circuit processors.

Pressing the MENU key will return you to the Main Menu.

Self Test  
Version: 805-8000001  
Checksum: 232BA7  
Failed Audio: None  
Failed Modulator: None

## Main Menu :-

### Channel Allocation

: Pressing key '4' of the handset results in the Channel Allocation sub-menu appearing on the screen as shown right.

### Channel Allocation

: Although there are 49 channels in the range 21 to 69, in practice some of them cannot be used because of interference. e.g. if N is the channel number, you cannot use:

Channel Number	Reason
$N + 1$ or $N - 1$	the unit uses a double sideband system.
$N + 5$ or $N - 5$	there may be interference from the TV's local oscillator.
$N + 9$	this may cause image interference on TV sets.

By typing in the channel numbers used for terrestrial TV in your local area, you can use the Channel Allocation Menu to calculate which channel numbers are appropriate to allocate to the SMATV channels.

You can also use the menu to allocate automatically four of the "free" channel numbers to the four receivers. These will become the default channel numbers in the Output Frequency Menu for each receiver. You can still override this default setting by changing the channel number at the Output Frequency Menu. If you set a channel number which conflicts with the channel restriction rules, there will be an on-screen warning when you leave this menu, which you can override if you wish.

The example menus show 4 terrestrial channels on channel numbers 23, 26, 30 and 33 and the VCR on channel 37. Note that in your area there may well be more than four channels occupied by terrestrial broadcasts.

Option 1: Enter local channels — enter the channel numbers occupied by the local terrestrial TV channels. Enter a channel number for a VCR (if required). To edit list, use the ◀ or ▶ keys to move between channels. To delete a channel, change number to 00.

Pressing the STORE key will save the desired settings.

Option 2: Possible channels — channels that are not used already by the system ("Free") are displayed for your information.

Pressing the MENU key or the NORM key will return you to normal viewing mode.

Channel Allocation

- 1 Enter local channels
- 2 Show possible channels
- 3 Automatic Allocation

Enter local channels  
37 33 30 26 23

Possible channels  
69 67 65 63 61 59  
57 55 53 51 49 47  
45 43 41

Option 3: Automatic allocation — Four of the free channels that have been allocated to the receivers are displayed here. To confirm this allocation and return to normal viewing mode press the STORE key.

Pressing the MENU key repeatedly will return you to the Main Menu.

Automatic Allocation

Input 1 69

Input 2 41

Input 3 67

Input 4 43

**Main Menu :-**

*Change PIN*

: Pressing key '5' of the handset results in the 'To change PIN' sub-menu appearing on the screen as shown right.

**Self Test Menu**

: Follow the messages on the screen to change PIN. (The default factory PIN number is 1234. )

Pressing the STORE key will save the PIN settings.

On completion press the MENU key repeatedly, this return you to the Main Menu.

To change PIN

Enter PIN:

New PIN:

Confirm PIN:

Confirmed

**Resetting the Default PIN :-**

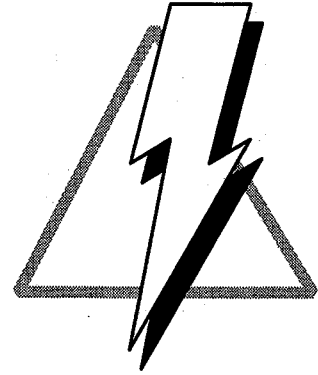
*To reset*

: Hold down the IR enable toggle switch whilst powering up the unit.

## HANDLING ELECTROSTATIC SENSITIVE (ES) DEVICES

Many semiconductor devices, such as integrated circuits and field effect transistors, can easily be damaged by static electricity. The following precautions should be observed when ES devices are being handled.

- Always use a grounded tip soldering iron and anti-static type solder removal devices.
- Before handling a device, discharge any electrostatic charge on your body by touching a known earth point - preferably use an earthed bench mat or ground mat together with a wrist strap.
- Do not remove an ES device from its protective packing until you are ready to fit it. Touch the protective material to the chassis or the assembly in which the ES device is to be installed, before removing the device from its packing.



## WORKING WITH CHIP COMPONENTS

### General Precautions for Handling and Storing Chips

Do not handle chips with your bare hands as this can cause oxidation on the chip's terminals which leads to poor soldering.

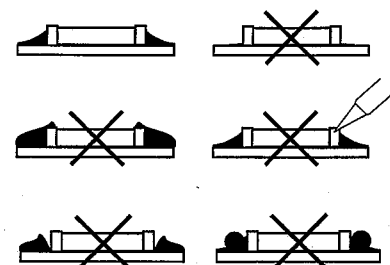
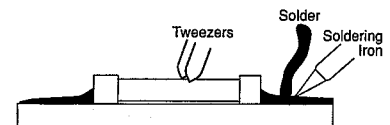
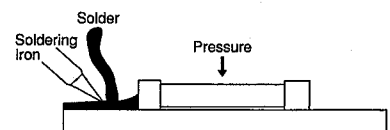
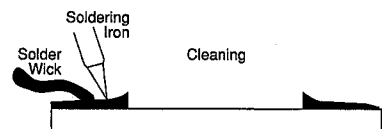
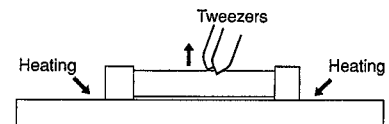
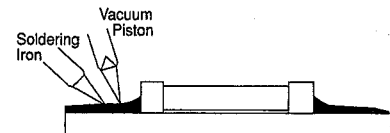
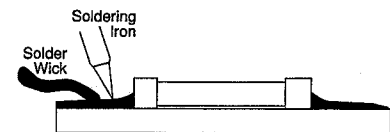
Do not store the chips in any of the following areas, as oxidation will occur and the capacitance and resistance will be affected:

- areas with sulphur or chlorine gas.
- direct sunlight.
- areas of high temperature and/or high humidity.

Rough handling of circuit boards containing surface mount devices can cause damage to the components as well as the board; never bend or flex such boards.

Do not heat or cool the boards unnecessarily, as the board materials expand and contract by differing amounts which can cause the components and solder connections to be stressed.

Never rub or scrape chip components as this can change their value. Do not slide the board across any surface.



### General Precautions for Attaching and Removing Chips

When using a soldering iron, take care and apply suitable pressure.

For preference, use a soldering iron rated at approx. 30 W with a thermostatic control to give soldering temperatures of approx. 225 to 250 °C.

Do not re-use chips which have been removed from the board.

When attaching chips, solder as quickly as possible so as not to damage the terminals and body of the chip. Do not touch the terminals directly with the soldering iron.

While soldering, keep the chip's body in contact with the board.

### Removing a Chip

Heat the solder for 2 to 3 seconds at each terminal of the chip.

Remove the molten solder with solder wick.

Holding the chip with a pair of tweezers, remove it gently from the board while the solder at each terminal is molten.

Wick off all excess solder from the board, so that it is ready for the mounting of new components.

### Attaching a Chip

Place the chip in the correct position and temporarily solder one terminal to the copper surface.

Holding the chip body with a pair of tweezers to position it accurately, complete the soldering at each terminal in turn.



## GAINING ACCESS TO THE UNIT

### REMEMBER - SAFETY FIRST

**WARNING:** always disconnect the unit from the mains supply before dismantling it.

**WARNING:** remove your wrist strap before applying power to the re-assembled equipment to avoid potential shock hazards.

**WARNING:** The incorrect substitution of electrolytic capacitors may result in an explosion hazard.

**CAUTION:** work on an earth mat and wear a wrist strap and earth lead to prevent electrostatic damage to the components. Once the main board is removed from the casing it is fairly flexible, so handle it carefully to avoid damaging the components.

**CAUTION:** You must replace all the PCB fixings, screws etc. when the unit is re-assembled, otherwise there could be hazards due to reduced clearances.

**CAUTION:** Before you apply mains power to the unit, always ensure that the voltage rating stated on the rear panel of the unit matches the mains voltage supply in the country of installation.

**CAUTION:** Do not spray any chemicals on or near the unit.

**CAUTION:** Replacements for faulty components must be of the correct value and rating and must be assembled by a competent engineer, otherwise safety approvals could be invalidated.

### Removing the Cover

Disconnect the unit from the mains. Unscrew the fixing screw (C) from the P-clip surrounding the mains cable, remove the mains cable away from the unit.

Remove the 9 tapite screws (A). Three are at the rear of the unit and one is in each side, a further four are located on the top (see Figure 1).

Hold both sides of the cover and slide it towards the rear of the unit to remove it.

### Removing the Modulator Board

Refer to Figure 2. Remove all connectors from Modulator PCB.

Whilst lifting the edge of the modulator PCB, crimp together the stand-off prongs (F) using tweezers to free the PCB.

Gently slide the PCB away from the side panel to remove it from the unit.

### Removing the Main PCB

Refer to Figure 1. Remove the nuts (G) from the F-type connectors.

Remove the phono socket screw (B), mains socket screw (B).

Whilst lifting the front edge of the main PCB, crimp together the stand-off prongs (E) using tweezers to free the PCB.

Gently slide the PCB upwards above the (F) prongs and then away from the rear panel to remove it from the casing.

### Re-assembling the Unit

Reverse the above procedures to re-assemble the unit. Screw the fixing screw (C) on the P-clip surrounding the mains cable and secure the cable to the unit.

Figure 1

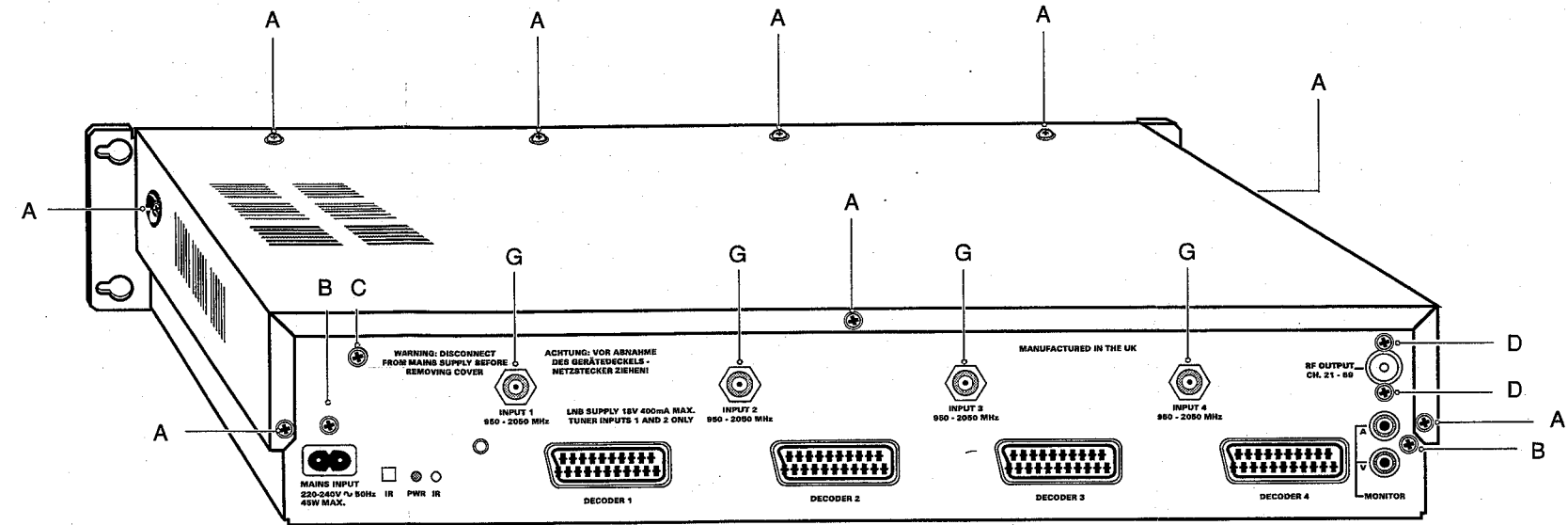
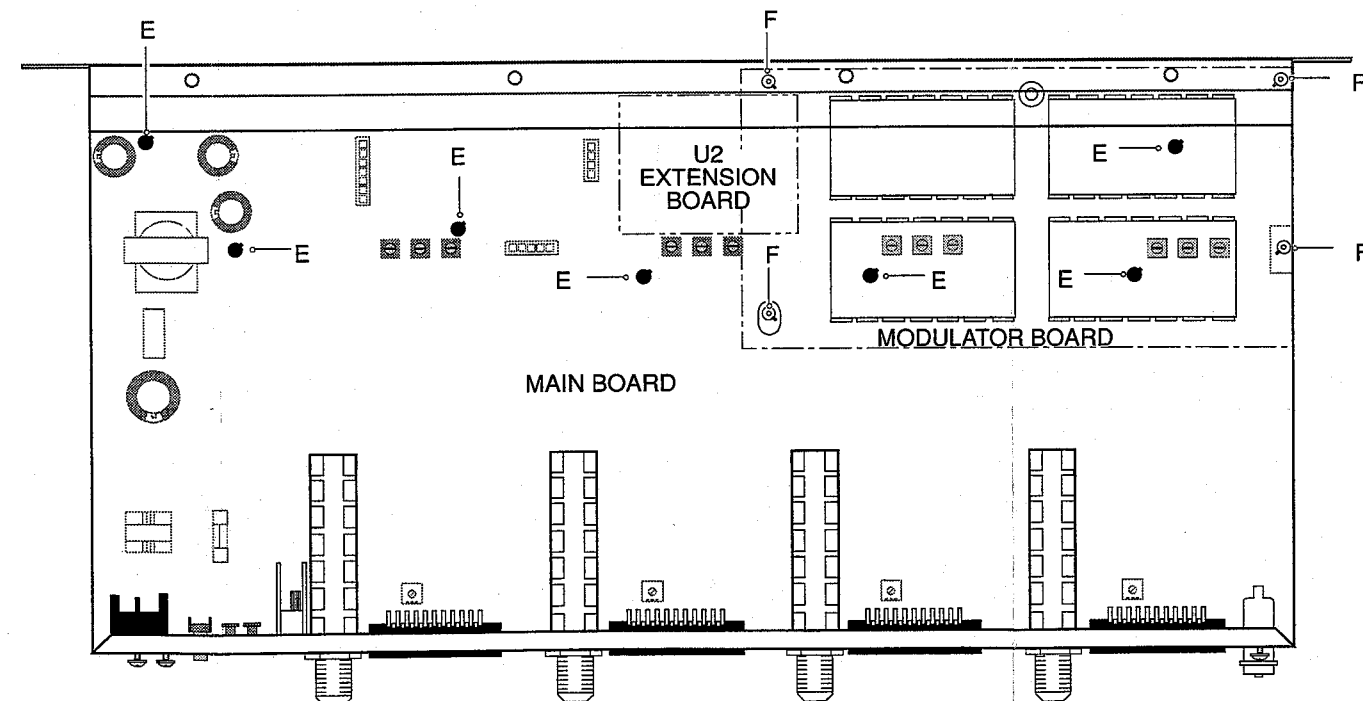
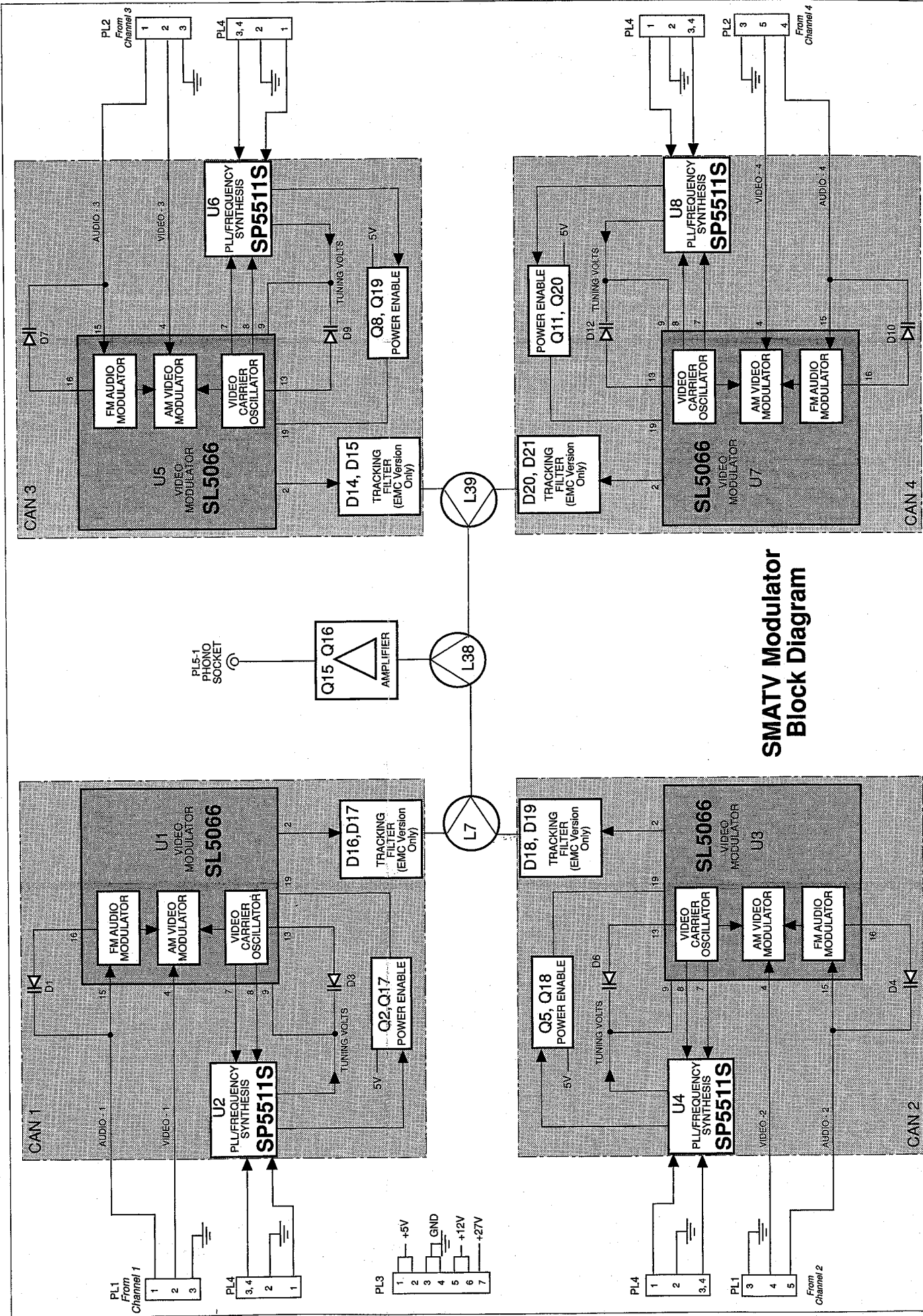


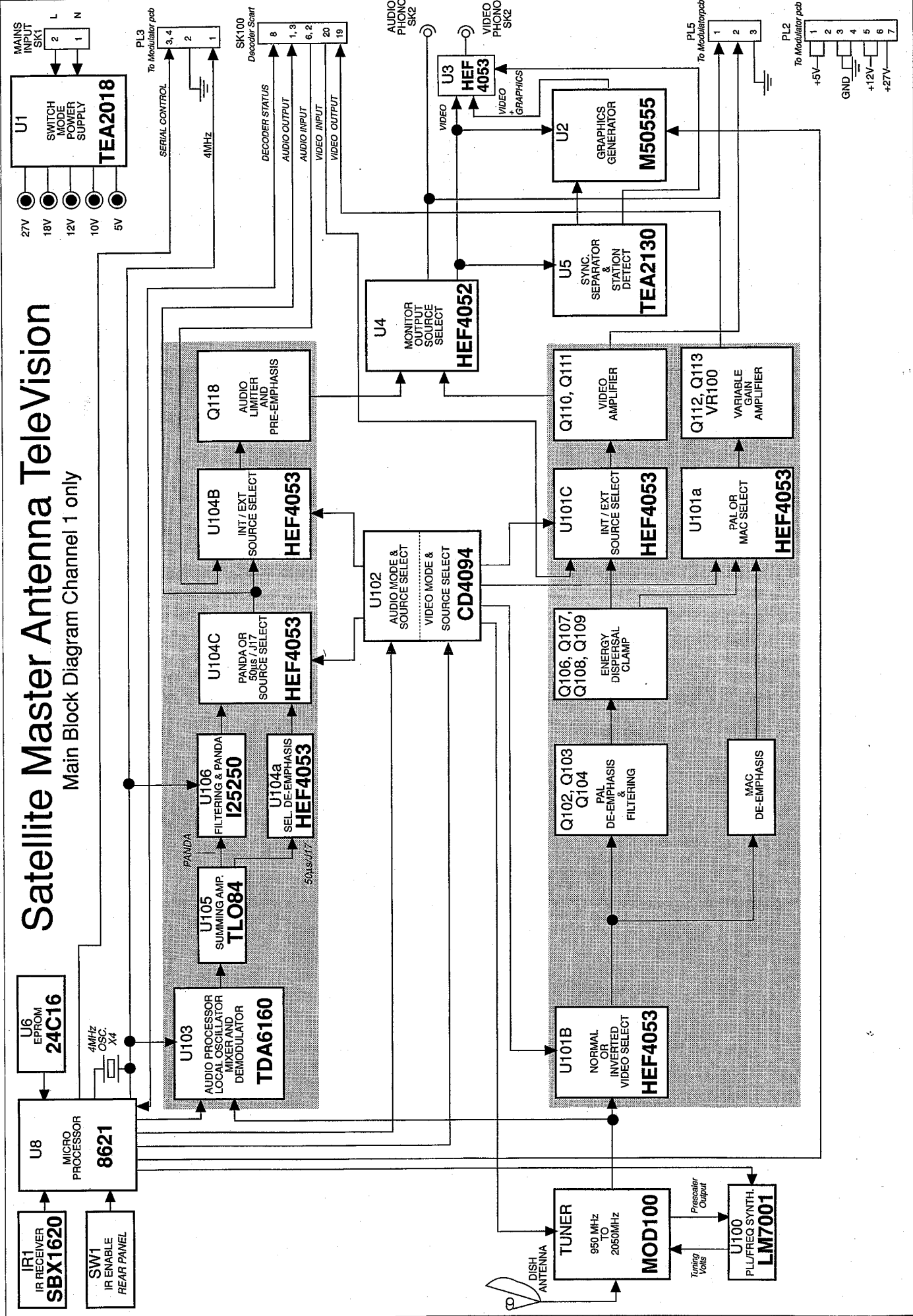
Figure 2



SMATV MODULATOR AND RECEIVER BLOCK DIAGRAMS



Satellite Master Antenna TeleVision  
Main Block Diagram Channel 1 only



## SMATV CIRCUIT DESCRIPTION

All of the component parts of the receiver are fitted on the main PCB and the Modulator PCB unless the receiver has a microprocessor extension fitted, in which case there is a separate daughter board (OTP) for this.

All of the functional blocks of receiver 1 and the modulator boards are shown on the two block diagrams shown on the previous page. The following motherboard description applies to receiver 1 only, however, all other receivers work exactly the same.

## RECEIVER MOTHERBOARD

### TUNER AND VIDEO PROCESSING

#### Tuner

Programme installation is selected via the handset. The infra-red enable button SW1 requires depressing after power up and a security password (PIN) is entered. Infra-red data from the handset is received by the sensor IR1. The TTL level data is fed to the microprocessor U8 (8621) for decoding. U8 interprets the information and when in the input frequency menu supplies tuning data to the PLL frequency synthesiser U100 (LM7001). This frequency synthesiser IC generates a tuning voltage which is fed to the tuner MOD100 on pin 15. The tuner's internal voltage controlled oscillator (VCO) which is 479.5 MHz higher in frequency than the chosen program is then mixed with the incoming satellite IF signal. The desired signal is then recovered by an IF stage centred at 479.5 MHz and having a bandwidth of 27 MHz. The PLL circuit is completed with a return prescaler output on pin 18 of the tuner MOD 100. This is the local oscillator frequency divided down by 64 and fed into pin 11 of the frequency synthesiser U100. The synthesiser (U100) divides down the prescaler input further according to the ratio given to it by the microprocessor U8 for the selected programme and compares it with a reference generated from the 5.625 MHz crystal (X100). Any frequency error is then used to generate the tuner control voltage via Q100 to pin 15 of MOD 100.

To compensate for LNB frequency conversion offsets, the synthesised frequency can be manually adjusted in the LNB install menu, thus ensuring the IF signal is tuned to the centre of the 479.5 MHz bandpass filter in the tuner.

The 479.5 MHz FM signal in the tuner is then demodulated giving an unfiltered, non-de-emphasised, unclamped composite video baseband signal (CVBS) on pin 13.

LNB supply voltage (18V) is provided on pin 5 of MOD 100 and MOD 200 only. The 5V rail is supplied on pin 12 for the tuner. For tuners with selectable bandwidths, (i.e. 27/18 MHz or 27/36 MHz) 0V on pin 14 of MOD 100 gives normal bandwidth (27MHz). The optional bandwidth is then software selectable via U102 and Q114 which set pin 14 'high' (5V).

#### Video Processing Circuitry

The baseband signal from pin 13 of the tuner is coupled to the baseband amplifier Q101 which provides both non-inverted and inverted action on the baseband signals (some CBAND transmissions have inverted video which requires inverting to make all the baseband signals the same polarity).

Normal or corrected CBAND video is selected via the switch U101B and controlled from U102 which receives I<sup>2</sup>C bus commands from the microprocessor U8. Clamped or unclamped video can be selected from the EXT decoder menu.

In 'clamped' mode the video signal is PAL de-emphasised through R115, R119 and C112 and amplified by Q102 and Q103. The signal is then coupled to an emitter follower Q104 into a 5.5 MHz low pass filter comprising of L100, L101 and C113, C115 and C117. Q105 provides phase compensation for chroma - lumina delay induced by the low pass filter. Energy dispersal in the signal is then removed by Q106, Q107, Q108 and associated components. The clamped, filtered PAL de-emphasised video is then fed to modulator (PL5) CAN1 and monitor source select U4.

The video signal is also fed to the clamped or unclamped video select IC U101A via R533 which is under control of the microprocessor U8, via U102. Unclamped, unfiltered video is fed from Q102 and MAC de-emphasis is achieved with C181 and R199. The signal is then amplified by the variable gain amp Q112 and Q113 adjustable by the potentiometer VR100 and fed to the decoder SCART output for descrambling purposes.

## Colour Graphics Generator

The graphics generator IC U2 and sync separator IC U5 are used to generate all the menus and associated characters. U5 takes video in from the source select IC U4 and provides line and frame synchronization signals for the graphics generator U2. Timing signals for U5 are derived from the external crystal resonator X2 operating at 503 kHz. This enables line and frame sync outputs even when no source video is present (useful in frequency scan mode).

U5 also provides a channel identification output which sets to 'high' when incoming video is phase locked. The channel identification signal is then used to latch a switch U3 which selects either graphics superimposed over incoming video or graphics over a blue background.

Associated with U2 are two oscillators. The crystal X1 generates a frequency of 17.734 MHz (4 times the frequency of the colour information) and is used to generate the colour background. The second oscillator is within U2 and is set by external components L4, C33 and C34 and is used to set the horizontal and vertical position of the on screen graphics.

## Audio Frequency Circuitry

Audio processing IC U103 performs three functions, these being :-

- Mixer.
- Oscillator.
- Demodulator.

The baseband signal from the tuner MOD 100 is buffered to pin 24 of U103 via an emitter follower Q116 and C133. The desired audio sub-carriers are selected under control of U8 and are mixed with a local oscillator to a frequency of 10.52 MHz for a right channel of a stereo pair and 10.7 MHz for a left channel. Mono sub-carriers are also mixed to 10.7 MHz.

The local oscillator is set by external components D103, L108 and C148 and its frequency varied by a tuning voltage from pins 2 and 3, under control of the microprocessor U8. U103 provides 2 IF outputs:-

- IF 1 is provided on pin 22, buffered by Q119 and filtered respectively by 2 sets of 10.7 MHz and 10.52 MHz narrowband filters for left and right carriers.
- IF 2 on pin 21 provides the selectable Mono wideband carriers, filtering is by a single filter centred at 10.7 MHz.

The filtered signals are then fed back into U103 via pins 15, 17 and 19 and demodulated internally. The FM discrimination slopes are factory set by adjustment of L105, L106 and L107 such that the DC bias is set to 2.4V on each of the audio output pins 8, 11 and 14 respectively.

U103 audio outputs go to a high impedance state when not selected. The selected audio is amplified by U105D and fed directly to the audio expander IC U106 and a 50µS/J17 de-emphasis selection IC U104. R-C network R182, C167 and C168 set the J17 frequency response. The audio signal is then passed through U105B which exhibits amplification and 75µS de-emphasis.

The audio signal then passes into a limiter circuit consisting of D104, D105, Q118 and associated components. This prevents wide deviation signals from some satellites from over deviating the audio modulator and possibly causing sound on vision patterning. Q118 also provides the necessary audio amplification to set the audio level to the same as terrestrial transmissions. R194 and retrofitted capacitor C185 apply pre-emphasis to the audio prior to remodulating the signal at standard terrestrial transmission frequencies.

The audio is also fed to U4, the audio monitor selector switch to provide an audio output via phono connection to a monitor during setting up of the SMATV unit.

## CONTROL CIRCUITRY

The main component in the control circuitry is U8 which is based on the Z8 microprocessor. Ultimately, receivers will contain U8 as a custom-masked single component. These take several weeks to produce, therefore in some receiver units, in place of U8, there is a small U8 extension PCB (One Time Programmable - OTP Board) comprising a standard microprocessor and separate EPROM. This is described below.

When the U8 custom IC is fitted, the OTP Board is removed.

U8 performs the following functions:

- It detects and decodes the codes received via the IR beam from the handset and from the front panel buttons.
- It generates the control signals for the on-screen graphics.
- It controls the frequency synthesis loops for the tuner and for the UHF modulator.
- It controls the routing of the video and audio signals.

U6 is an E<sup>2</sup>PROM which is used to store information which is set at the on-screen menus.

U9 is a buffer which limits the current at the ports of U8.

The above functions are controlled by U8, which runs with a 4 MHz clock generated by crystal X1.

### U8 Extension PCB (OTP Board)

This is inserted in the place of U8. When it is in position, the main PCB no longer contains the 4 MHz crystal X1 and capacitors C32 and C33. These three components are, instead, assembled on the U8 extension PCB (although note that the capacitors are renamed as C5 and C6 respectively when they are moved, and their values change to compensate for the move to 33pf and 39pf).

The board contains the following additional components: two capacitors (C3 and C4) and three ICs (U1, U3 and U4). U1 is a standard microprocessor, U3 is some TTL logic and U4 is an EPROM. (Note that components C3, C4, C5, C6, U1, U3 and U4 on this small PCB are quite different from the components with these circuit references which are on the main PCB, only X1 is the same.)

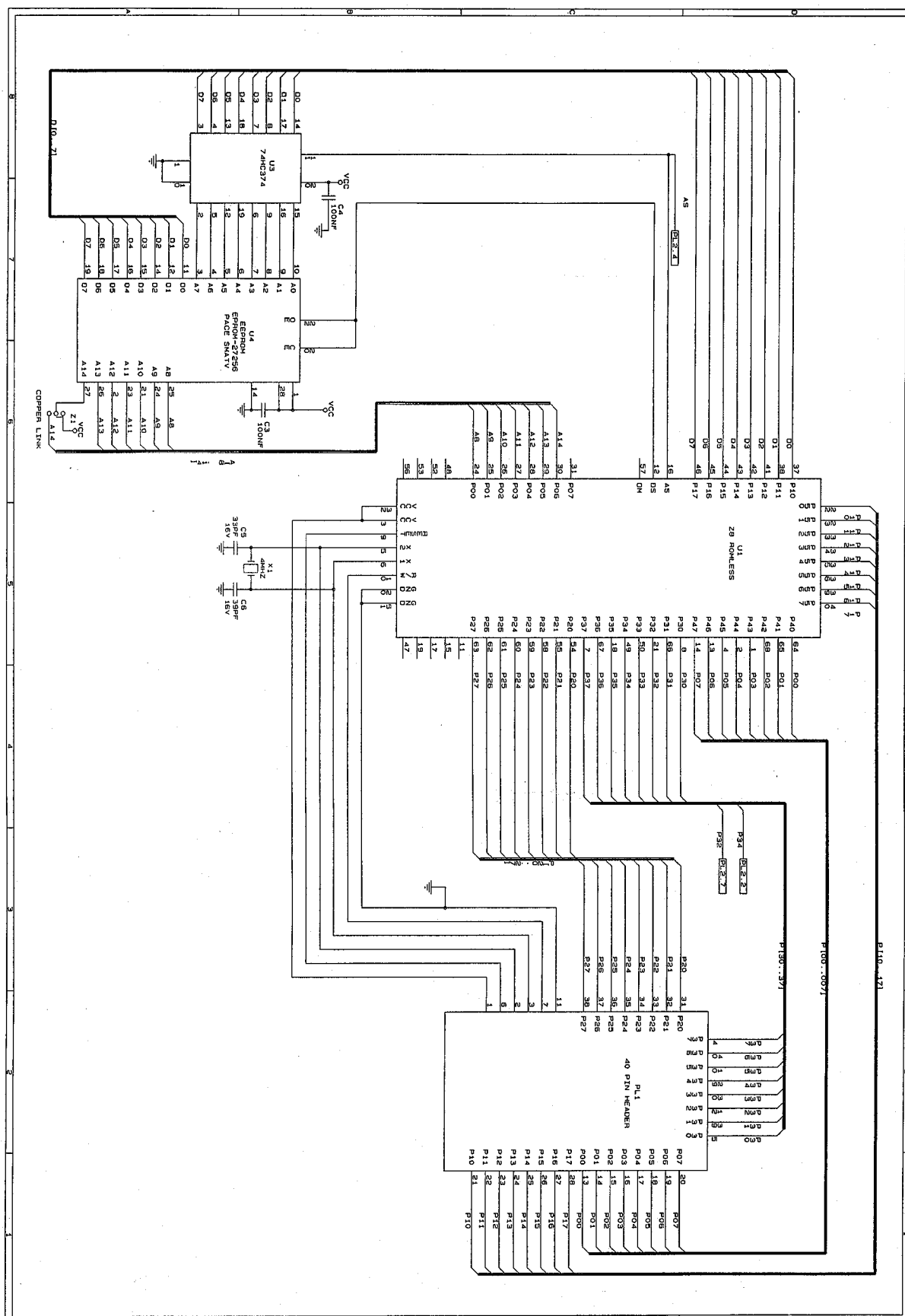
A circuit diagram and PCB diagram for the U8 extension board given opposite.

### Replacement of the U8 Extension PCB by U8 Microprocessor

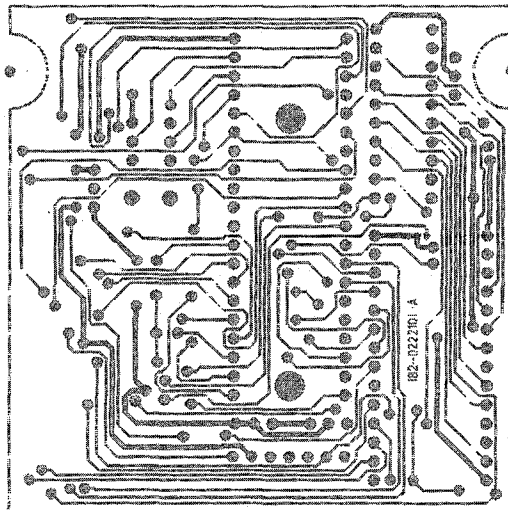
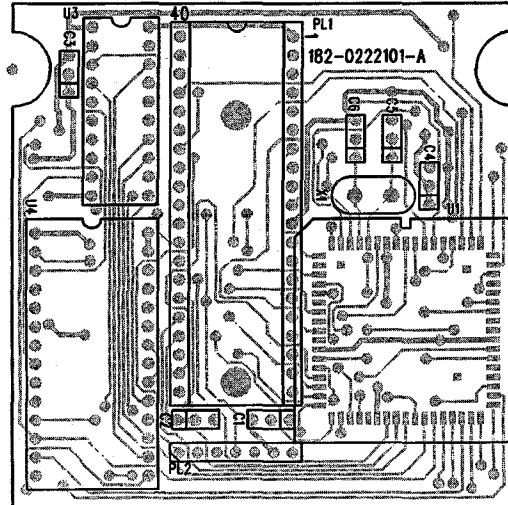
When the custom-masked IC U8 becomes available, the U8 extension PCB assembly will be replaced by the 40-pin integrated circuit U8, which fits directly onto the main PCB.

At the same time that U8 is mounted, crystal X1 will need to move back onto the main PCB, and the capacitors C32 and C33 refitted.

### U8 EXTENSION (OTP BOARD) CIRCUIT DIAGRAM



## U8 EXTENSION PCB (OTP BOARD)



## **SWITCH MODE POWER SUPPLY**

### **Mains Input and Rectification**

Diodes D1, D2, D3 and D4 rectify the ac mains voltage and, together with smoothing capacitor C2, provide the dc input HT for the SMPS. C1 and T1 form a mains filter to minimise the feedback of RFI into the mains supply. Asymmetrical mains pollution is reduced by the insertion of R19 and C9 between the primary ground and the secondary chassis ground. These components are required to satisfy the mains isolation requirements. They are also safety-critical components of the correct type.

### **SMPS Controller U1**

The start-up supply for U1 (TEA2018) is obtained via R2 which charges C5 to approximately 6 V before U1 will power up. C5 sustains a charge long enough for the switch mode to reach its operating frequency. The supply for U1 is subsequently obtained from a feedback winding of the transformer T2, rectified by D7.

The frequency of the switch mode is set by R12 and C4 and should be 25 to 30 kHz.

Regulation is via the feedback winding which is rectified by D8 and set by R10, R11 and R8 to give a voltage of 2.4 V at pin 8 of U1 when the supplies are at their specified voltages (5 V, 12 V etc.).

The switching transistor for the switch mode, Q1, is driven directly from U1. A negative supply is generated across D10 which is switched through U1 from pin 4 to pin 5 thereby switching Q1 off. Excess energy from the switching of Q1 is dissipated in a snubber network R4, D5, D6 and C3. Overcurrent protection is implemented by sampling the current through Q1 with R6 and feeding the resulting voltage to pin 3 of U1 via R13. The overcurrent threshold voltage on pin 3 is 1 V.

### **Circuitry on Secondary Side of T2**

The secondary winding of the transformer T2 provide 5 V, 12 V, 18 V and 27 V supplies which are rectified, smoothed and filtered.



## SMATV MODULATOR PCB

The modulator board is split into four identical modules, each module consisting of a PLL/synthesiser and modulator. The four RF outputs are combined and amplified to provide a single UHF output which can be combined with other SMATV products and terrestrial transmissions.

In CAN 1, for example, the heart of the modulator is based around U1, consisting of an AM video modulator, video carrier VCO, FM audio modulator, and automatic gain control and clamp circuitry. Video from PL1 is low pass filtered and connected directly to pin 4 of U1. Audio from PL1 is connected to an oscillator tuned circuit consisting of varicap diode D1, C13, C14, C15 and L3. C13 is chosen depending on the required subcarrier frequency (PAL-I, PAL-G or PAL-K transmission), and should be selected as a negative temperature coefficient (COG) capacitor to compensate for temperature variations.

The oscillator is frequency modulated by the audio signal and mixed on to the vision carrier. The VCO within U1 is completed by a tuned circuit connected to pins 9, 10, 12 and 13. Tuning volts are derived from U2, PLL/synthesiser IC under control of the main board processor, and are in the range of 0 to 27 volts.

The PLL circuit is completed by the two differential prescaler output pins 7 and 8 which connect directly to U2 on pins 13 and 14. Modulation depth is set to 80% by R2 on pin 3 and U1.

UHF output emerges from pin 2. On units that have European approval for Electro-Magnetic Compatibility (EMC) the RF is passed through a tracking low-pass filter consisting of D16 and D17 and associated components which attenuate the inter-modulation products of the double sideband output. Tracking is achieved by tapping off the tuning volts to alter the capacitance of the varicap diodes D16 and D17 such that the 3 dB roll off point for the filter is proportional to the RF frequency generated.

The RF then passes through a matching circuit and padding before combining with the RF from CAN 2 using balun L7. The RF is then further combined with CAN 3 and CAN 4 via balun L38. Further matching is implemented before 2 stages of main amplification at Q13 and Q21 and Q15 and Q16. On units with EMC approval, the RF passes through a 400 MHz high pass filter prior to being amplified and combined. The amplified combined RF is then fed direct to the phono socket J1 and then distributed by coaxial cable. A further feature is a power enable circuit which switches the modulator IC U1 on or off, by software selection. This is achieved with a spare port output on U2 pin 9 and is used to enable switching transistors Q2 and Q17 to provide +5V to the modulator IC. The port is operated under control of the main board microprocessors.

**NOTE:** Units that have European approval for EMC can be recognised by the modulator board part number suffix being E onwards.

## SMATV PCB OSCILLOGRAMS

The oscillograms which follow are numbered sequentially and the appropriate section and circuit diagram identification are also given above each. The oscillogram numbers are marked on the circuit diagrams and the PCB component identification diagrams. An oscilloscope probe with x10 attenuation is recommended, particularly when measuring high frequency oscillators.

Alongside each oscillogram is a note of where the test is made, a brief description (including any special instructions that may be necessary) and an indication of which components require to be checked if the oscillogram you are viewing on your oscilloscope is not the same as that shown on the page. Unless specified otherwise, all the oscillograms have been produced using a DC coupled oscilloscope probe and have the ground at the bottom of the oscillogram trace.

**Test Point:** Q101/Q201/Q301/Q401 emitter (4 receivers)

**Description:** The oscilloscope is AC coupled, the centre of the trace is set for 0V. The oscillogram trace shows the expected unfiltered, unclamped tuner output baseband waveform. All four receivers are identical, equiv. components are named.

**If the trace is not as shown, check:**

- the appropriate transistor in each individual receiver, Q101/Q201/Q301 or Q401 and assoc. components.
- the 5.625MHz clock on pins 1 and 2 of U100/U200/U300 or U400 and their associated components.
- that the tuning voltage on the drain of Q100/Q200/Q300 or Q400 varies when the input frequency is adjusted.
- the appropriate LNB voltage is present on pin 5 of MOD100 and MOD200.

**Test Point:** Pin 11 of Frequency Synthesiser chip U100/U200/U300 or U400.

**Description:** The oscillogram trace shows the expected tuner PLL prescaler output signal waveform. The amplitude may vary across the tuning range as will its frequency.

**If the trace is not as shown, check:**

- MOD100, MOD200, MOD300 or MOD400.
- that the tuning voltage on the drain of Q100/Q200/Q300 or Q400 varies when the input frequency is adjusted.
- the appropriate LNB voltage is present on pin 5 of MOD100 and MOD200.

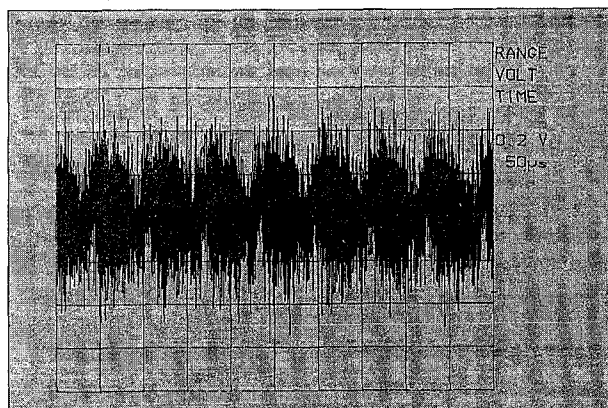
**Test Point:** Q105/Q205/Q305/Q405 base (4 receivers)

**Description:** The oscillogram trace with a timebase of 5ms shows the expected 1V p-p video signal waveform still with 25Hz energy dispersal after filtering and de-emphasis.

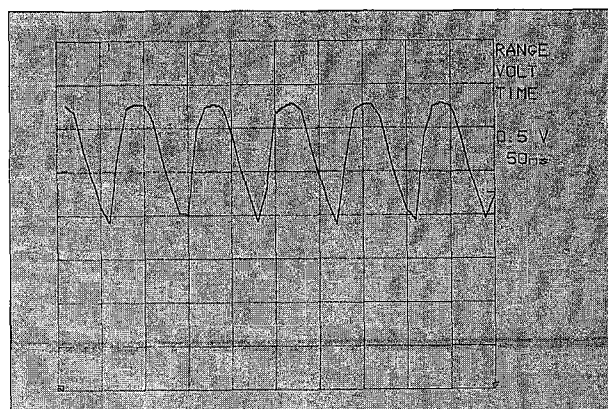
**If the trace is not as shown, check:**

- routing switch U101/U201/U301 or U401.
- video amplifier circuit networks in Receivers 1 to 4:-  
Rx 1 - Q102 to Q104, Rx 2 - Q202 to Q204,  
Rx 3 - Q302 to Q304, Rx 4 - Q402 to Q404 and assoc. components.

### 1. TUNER OUTPUT (BASEBAND) MainBoard Diagram

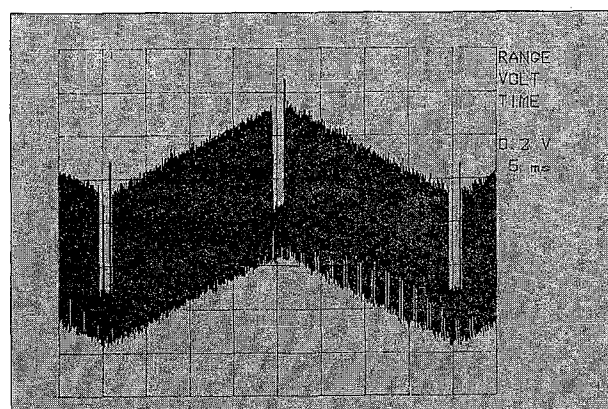


### 2. PLL PRESCALER OUTPUT Main Board Diagrams



### 3A. VIDEO

### Main Board Diagrams



**Test Point:** Q105/Q205/Q305/Q405 base (4 receivers).

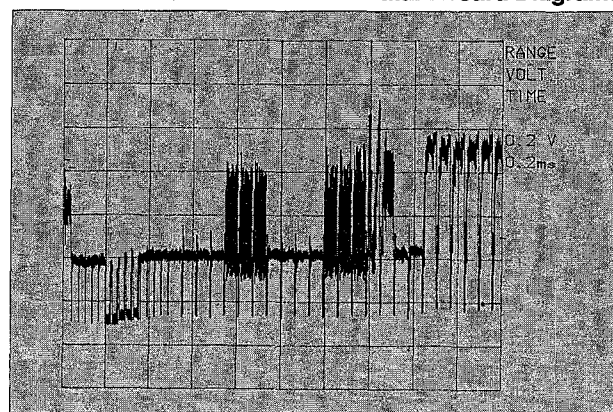
**Description:** The oscillogram trace expanded to a timebase of 0.2ms shows the 1V p-p video signal waveform still with 25Hz energy dispersal after filtering and de-emphasis.

**If the trace is not as shown, check:**

- as 3A

### 3B. VIDEO

### Main Board Diagrams



**Test Point:** Q109/Q209/Q309/Q409 emitter (4 receivers).

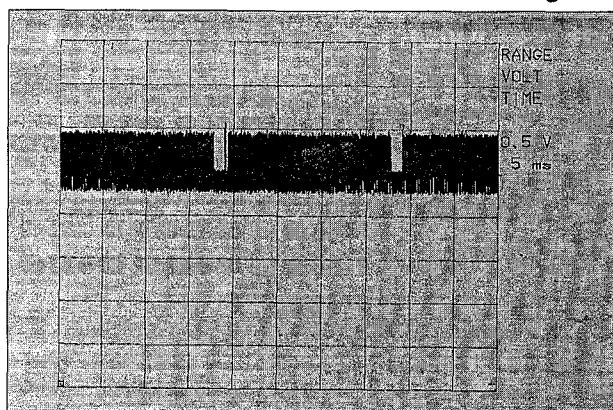
**Description:** The oscillogram trace shows the expected video signal waveform after filtering and de-emphasis and energy dispersal removal. Note the DC level.

**If the trace is not as shown, check:**

- video amplifier circuit networks:-  
Rx 1- Q105 to Q109, Rx 2- Q205 to Q209,  
Rx 3 - Q305 to Q309 , Rx 4- Q405 to Q409 and assoc. components.

### 4. VIDEO

### Main Board Diagrams



**Test Point:** PL5 pin 2, PL5 pin 4 and PL4 pin 2, PL4 pin 4 .

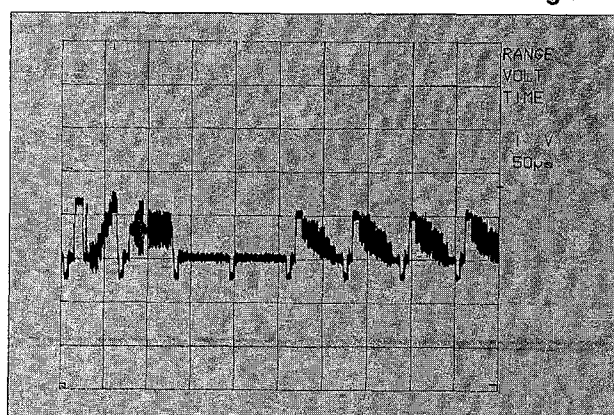
**Description:** The oscillogram trace shows the expected video signal waveform feeding the modulator.

**If the trace is not as shown, check:**

- routing switch U101/U201/U301 or U401.
- video amplifier circuit networks:-  
Rx 1- Q110 & Q111, Rx 2- Q210 & Q211,  
Rx 3 - Q310 & Q311 , Rx 4- Q410 to Q411 and assoc. components.

### 5. VIDEO OUTPUT

### Main Board Diagrams



**Test Point:** Q5 emitter.

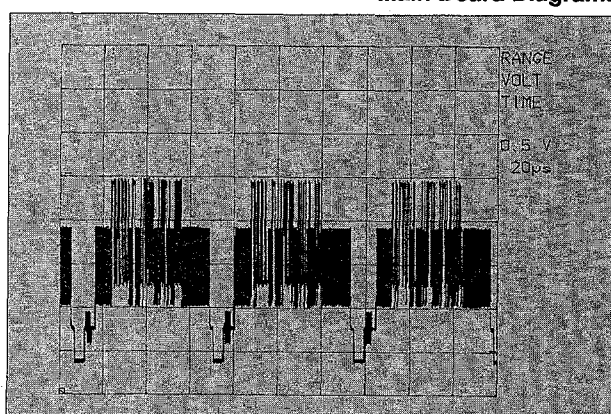
**Description:** The oscillogram trace shows the video signal when a menu is added over a blue background showing the text at the centre of each horizontal waveform.

**If the trace is not as shown, check:**

- Graphic Generator U2 and associated circuitry.
- U2 pin 30 (oscilloscope 7).

### 6. VIDEO+ MENU

### Main Board Diagrams



**Test Point:** Pin 30 of Graphic Generator chip U2.

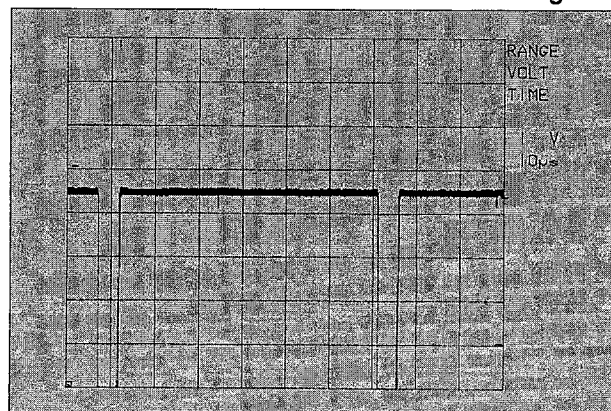
**Description:** The oscillogram trace shows the horizontal synchronizing pulse (64 $\mu$ s spacing) waveform generated by Sync. Separator chip U5.

**If the trace is not as shown, check:**

- pin 17 of U5 for the 503kHz oscillation of X2.
- U5 and associated circuitry

## 7. VIDEO

## Main Board Diagrams



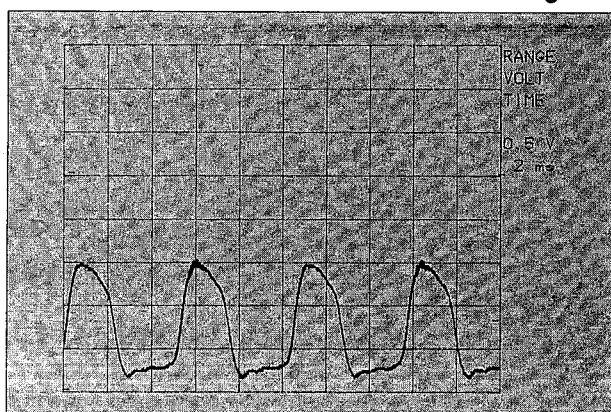
**Test Point:** Pin 1 of the audio demodulator U103/U203/U303 or U403.

**Description:** The oscillogram trace shows the expected 4MHz clock reference waveform.

**If the trace is not as shown, check:**

- Q7 and crystal X1.

## 8. 4MHz REFERENCE CLOCK Main Board Diagrams



**Test Point:** Pin 4 of the audio demodulator chips U103/U203/U303 or U403.

**Description:** The oscillogram trace shows the expected oscillation waveform of the VCO of U103.

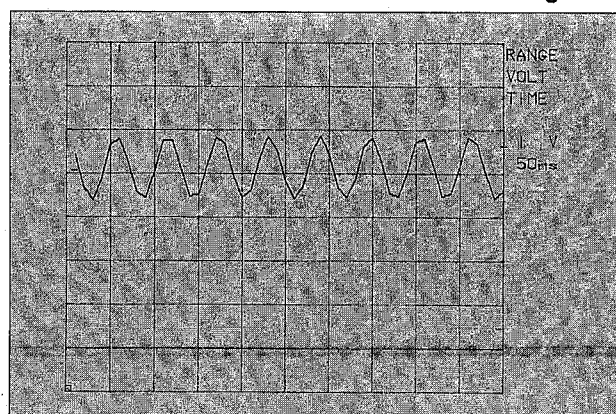
**NOTE:** the capacitance of the oscilloscope probe may alter the displayed frequency from the one expected.

**If the trace is not as shown, check:**

- that tuning the audio subcarrier in the range 5MHz to 9MHz will cause the oscillation frequency to vary from 15.7MHz to 19.7MHz.
- tuning volts on pin 3 of the demodulator chip and ensure that it also varies.
- if no variation of above happens, check the varicap diode (D103/D203/D303 or D403) and its assoc. components.

## 9. AUDIO VCO

## Main Board Diagrams



**Test Point:** Pin 24 of the audio demodulator chips U103/U203/U303 or U403.

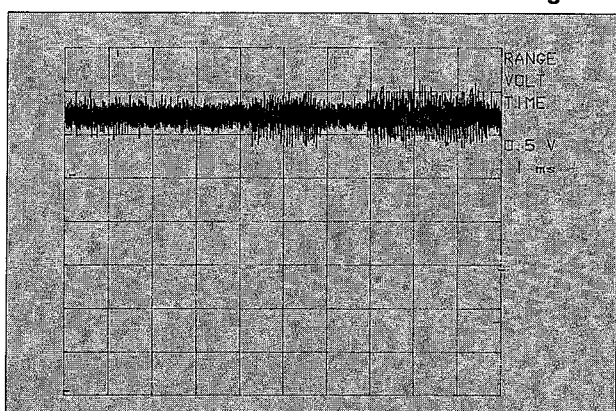
**Description:** The oscillogram trace shows the audio IF signal waveform.

**If the trace is not as shown, check:**

- the respective tuner output on pin 13 (i.e. MOD100, MOD 200, MOD 300 or MOD 400).
- Rx 1 - Q116, Rx 2 - Q216, Rx 3 - Q316, Rx 4 - Q316 and assoc. circuitry.

## 10. AUDIO IF

## Main Board Diagrams





**Test Point:** The negative electrodes of C151/C251/C351 or C451 (in the appropriate receiver circuit).

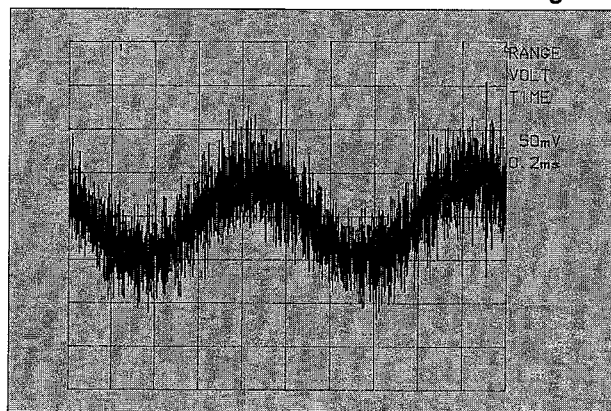
**Description:** The oscilloscope is AC coupled, the centre of the trace is set for 0V. The oscillogram trace shows the expected unfiltered, non de-emphasised baseband audio tone waveform.

**If the trace is not as shown, check:**

- the respective demodulator chip (U103/U203/U303 or U403) and its assoc. components)

## 11. AUDIO

## Main Board Diagrams



**Test Point:** The base of Q118/Q218/Q318 or Q418.

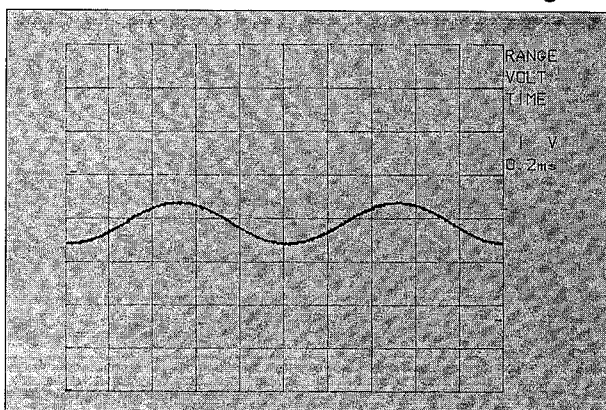
**Description:** The oscillogram trace shows the audio tone waveform after filtering, de-emphasis and noise reduction. Note the DC level.

**If the trace is not as shown, check:**

- the filtering and Panda expander chip U106 or U306 and assoc. circuitry.
- 4MHz clock on pin 8 of U106 and U306.
- audio routing switches Rx 1 - U104, Rx 2 - U204, Rx 3 - U304 or Rx 4 - U404.
- audio amplifier stages U105 or U305.

## 12. AUDIO

## Main Board Diagrams



**Test Point:** Pin 5 of the microprocessor chip U8.

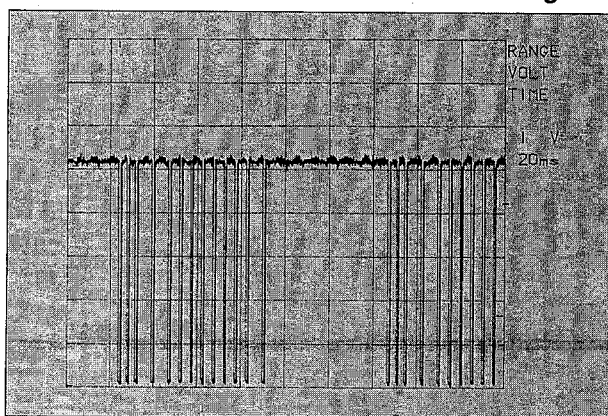
**Description:** The oscillogram trace shows the typical data signal out of the IR sensor: press keys on the handset to obtain the trace.

**If the trace is not as shown, check:**

- IR enable switch is enabled.
- handset.
- IR 1.

## 13. INFRA-RED DATA

## Main Board Diagrams



**Test Point:** Pin 38 of the microprocessor chip U8.

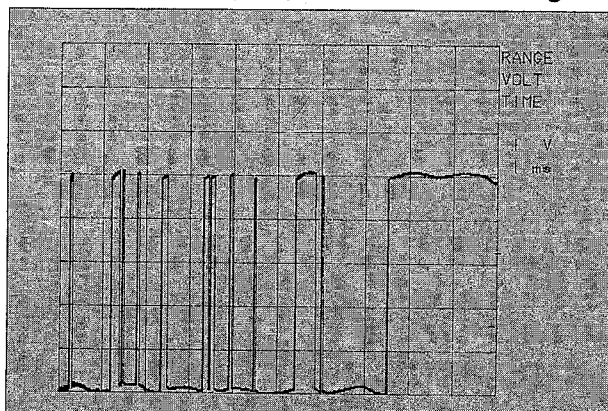
**Description:** The oscillogram trace shows the typical serial data (SDA) signal on the I<sup>2</sup>C bus when the handset is operated.

**If the trace is not as shown, check:**

- the microprocessor U8 and any ICs on the I<sup>2</sup>C bus.

## 14. SERIAL DATA (SDA)

## Main Board Diagrams



**Test Point:** Pin 29 of the microprocessor chip U8.

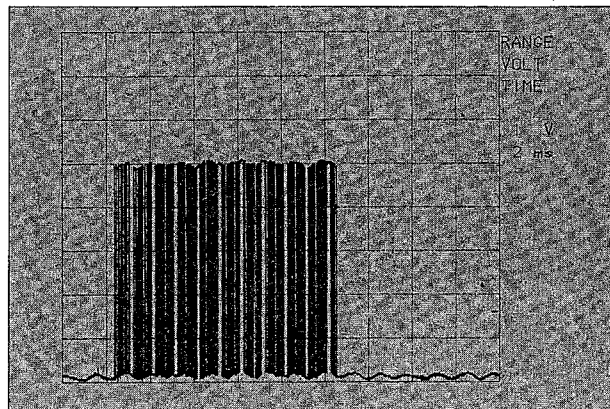
**Description:** The oscillogram trace shows the typical serial clock (SCL) signal on the I<sup>2</sup>C bus when the handset is operated.

**If the trace is not as shown, check:**

- the microprocessor U8 and any ICs on the I<sup>2</sup>C bus.

## 15. SERIAL CLOCK (SCL)

Main Board Diagrams



**Test Point:** Pin 4 of video modulator chip U1/U3/U5 or U7.

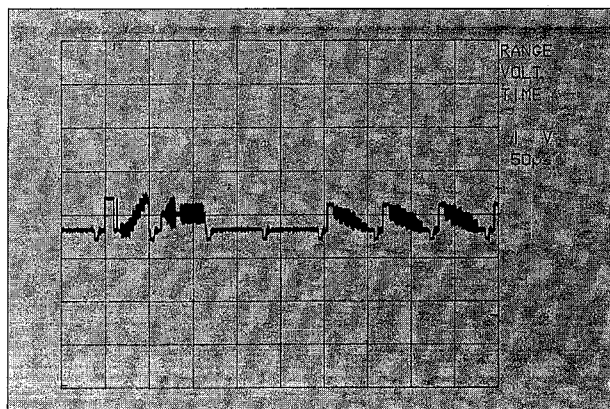
**Description:** The oscillogram trace shows the 1 volt p-p of video waveform showing the vertical interval test signals (VITS) and three active lines of a satellite transmission.

**If the trace is not as shown, check:**

- the respective amplifier stage, Q110-Q111, Q210-Q211, Q310-Q311 or Q410-Q411.
- the associated modulator plug PL1 pin 2/PL1 pin 4/PL2 pin 2 or PL2 pin 4.

## 16. VIDEO

Modulator Diagram



**Test Point:** Pin 15 and 16 of video modulator chip U1/U3/U5 or U7.

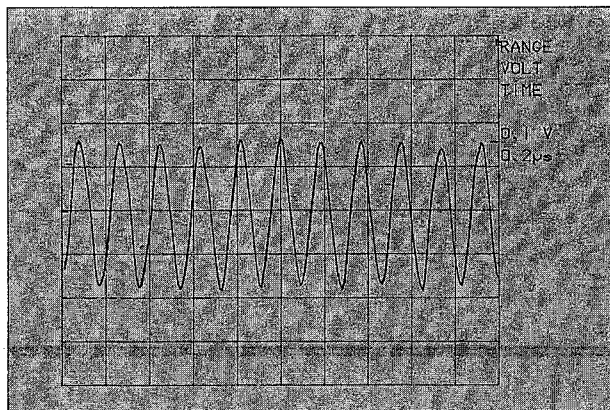
**Description:** The oscillogram trace shows the oscillation of the audio subcarrier, its frequency will be different according to the television standard being transmitted and will vary slightly when modulated by the incoming audio signal.

**If the trace is not as shown, check:**

- the appropriate video modulator chip U1/U3/U5 or U7.
- the varicap diodes D1/D4/D7 or D10 and the assoc. circuitry.
- for the presence of an audio signal at the cathode of D1/D4/D7 or D10.

## 17. AUDIO SUBCARRIER

Modulator Diagram



## SPARES - PARTS LIST

### ELECTRICAL PARTS FOR MAIN BOARD

#### Capacitors

C1	CLASS X CAP-100NF 250V 20%	159-1048780
C2	100UF 400V +20% 10MM 105 RAD ELEC CAP	855-1079780
C3	CER CAP 1NF 2KV 7.5MM 10% HR SERIES TR	159-1029651
C4	SMD 1.2NF 50V 5% CER COG CAP 0805 (TRS)	950-1225501
C5	1000UF 16V 5MM RAD ELEC' CAP (10X16)	155-1081750
C6	22UF 16V 5MM RADIAL ELECT' CAP TR	155-2261751
C7	10UF 25V 5MM RADIAL ELECT' CAP TR	155-1062751
C8	10UF 25V 5MM RADIAL ELECT' CAP TR	155-1062751
C9	*A* CLASS Y CAP-4N7 250V 20%	159-4728781
C10	SMD 220NF 50V 5% CER COG CAP 0805 TRS	950-2245501
C11	100UF 35V 5MM RADIAL ELECT' CAP	155-1073751
C12	SMD 330PF 50V 10% CER COG CAP 0805 (TRS)	950-3315601
C13	SMD 220NF 50V 5% CER COG CAP 0805 TRS	950-2245501
C14	2200UF 25V +20% 7.5MM RAD ELEC YXB CAP	855-2282760
C15	100UF 35V 5MM RADIAL ELECT' CAP	155-1073751
C16	SMD 330PF 50V 10% CER COG CAP 0805 (TRS)	950-3315601
C17	SMD 220NF 50V 5% CER COG CAP 0805 TRS	950-2245501
C18	2200UF 25V +20% 7.5MM RAD ELEC YXB CAP	855-2282760
C22	SMD 330PF 50V 10% CER COG CAP 0805 (TRS)	950-3315601
C23	SMD 220NF 50V 5% CER COG CAP 0805 TRS	950-2245501
C24	2200UF 25V +20% 7.5MM RAD ELEC YXB CAP	855-2282760
C25	1000UF 16V 5MM RAD ELEC' CAP (10X16)	155-1081750
C28	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C29	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C30	4.7UF 16V 5MM RADIAL ELECT' CAP TR	155-4751751
C31	SMD 220NF 50V 5% CER COG CAP 0805 TRS	950-2245501
C32	SMD 220NF 50V 5% CER COG CAP 0805 TRS	950-2245501
C33	SMD 33PF 50V 5% CER COG CAP 0805 (TRS)	950-3305501
C34	SMD 33PF 50V 5% CER COG CAP 0805 (TRS)	950-3305501
C35	SMD 12PF 50V 5% CER COG CAP 0805 (TRS)	950-1205501
C36	SMD 12PF 50V 5% CER COG CAP 0805 (TRS)	950-1205501
C37	2.2UF 16V 5MM RADIAL ELECT' CAP TR	155-2251751
C38	3.3UF 16V 5MM RADIAL ELECT' CAP TR	155-3351751
C39	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C40	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C41	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C42	1UF 16V 5MM RADIAL ELECT' CAP TR	155-1051751
C43	22UF 16V 5MM RADIAL ELECT' CAP TR	155-2261751
C44	SMD 3.3NF 50V 5% CER CAP 0805 (TRS)	950-3325501
C45	SMD 68NF 25V 10% CER X7R CAP 0805 (TRS)	950-6832621
C46	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C47	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C48	SMD 220NF 50V 5% CER COG CAP 0805 TRS	950-2245501
C49	SMD 100PF 50V 5% CER COG CAP 0805 (TRS)	950-1015501
C50	SMD 220NF 50V 5% CER COG CAP 0805 TRS	950-2245501
C51	SMD 1N5 50V 10% CER.CAP 0805 (TRS)	950-1525601
C52	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C53	SMD 22NF 50V 10% CER.CAP 0805	950-2235601
C54	SMD 4N7 50V 5% CER CAP 0805 (TRS)	950-4725501
C55	SMD 4N7 50V 5% CER CAP 0805 (TRS)	950-4725501
C56	10UF 25V 5MM RADIAL ELECT' CAP TR	155-1062751
C57	SMD 3.3NF 50V 5% CER CAP 0805 (TRS)	950-3325501
C58	SMD 470PF 50V 10% CER.CAP 0805 (TRS)	950-4715601
C59	4.7UF 16V 5MM RADIAL ELECT' CAP TR	155-4751751
C60	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C63	SMD 18PF 50V 5% CER COG CAP 0805 (TRS)	950-1805501
C66	1UF 16V 5MM RADIAL ELECT' CAP TR	155-1051751
C67	220UF 16V 5MM RADIAL ELECT' CAP TR	155-2271751
C68	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C70	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C101	SMD 33PF 50V 5% CER COG CAP 0805 (TRS)	950-3305501
C102	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C103	1000UF 16V 5MM RAD ELEC' CAP (10X16)	155-1081750
C104	10UF 35V 5MM RADIAL ELECT' CAP TR	155-1063751
C105	SMD 100NF 50V 20/80% CER Y5V CAP 0805 TR	950-1045951

C106	SMD 10NF 50V 5% CER.CAP 0805	950-1035501
C107	SMD 15PF 50V 5% CER COG CAP 0805 (TRS)	950-1505501
C108	SMD 15PF 50V 5% CER COG CAP 0805 (TRS)	950-1505501
C109	1000UF 16V 5MM RAD ELEC' CAP (10X16)	155-1081750
C110	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751
C111	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751
C112	SMD 390PF 50V 5% CER COG CAP 0805 (TRS)	950-3915501
C113	SMD 10PF 50V 5% CER CAP 0805 (TRS)	950-1005501
C115	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C117	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C118	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C119	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C120	SMD 100PF 50V 5% CER COG CAP 0805 (TRS)	950-1015501
C121	SMD 100PF 50V 5% CER COG CAP 0805 (TRS)	950-1015501
C122	SMD 100NF 25V 10% CER X7R CAP 0805 (TRS)	950-1042621
C123	SMD 100NF 25V 10% CER X7R CAP 0805 (TRS)	950-1042621
C124	SMD 100PF 50V 5% CER COG CAP 0805 (TRS)	950-1015501
C125	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C126	22UF 16V 5MM RADIAL ELECT' CAP TR	155-2261751
C127	SMD 180PF 50V 5% CER COG CAP 0805 TR	950-1815501
C128	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751
C129	470UF 16V 5MM RADIAL ELECT' CAP TR	155-4771751
C130	SMD 0.1W 5% ZEROHM LINK-0805 (TRS)	940-0000501
C131	SMD 220NF 50V 5% CER COG CAP 0805 TRS	950-2245501
C133	SMD 330PF 50V 10% CER COG CAP 0805 (TRS)	950-3315601
C134	1000UF 16V 5MM RAD ELEC' CAP (10X16)	155-1081750
C135	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C136	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C137	SMD 100PF 50V 5% CER COG CAP 0805 (TRS)	950-1015501
C139	1UF 16V 5MM RADIAL ELECT' CAP TR	155-1051751
C140	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C141	SMD 100PF 50V 5% CER COG CAP 0805 (TRS)	950-1015501
C142	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C146	SMD 100NF 25V 10% CER X7R CAP 0805 (TRS)	950-1042621
C147	SMD 10NF 50V 5% CER.CAP 0805	950-1035501
C148	SMD 390PF 50V 5% CER COG CAP 0805 (TRS)	950-3915501
C149	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C150	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C151	1UF 16V 5MM RADIAL ELECT' CAP TR	155-1051751
C153	1UF 16V 5MM RADIAL ELECT' CAP TR	155-1051751
C154	SMD 150PF 50V 5% CER COG CAP 0805 (TRS)	950-1515501
C155	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C156	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C157	220UF 16V 5MM RADIAL ELECT' CAP TR	155-2271751
C159	SMD 33NF 25V 10% CER X7R CAP 0805 (TRS)	950-3332621
C160	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C161	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751
C162	SMD 2.2NF 50V 5% CER COG CAP 0805 (TRS)	950-2225501
C163	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C164	220UF 16V 5MM RADIAL ELECT' CAP TR	155-2271751
C165	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C166	SMD 15NF 50V 10% CER X7R CAP 0805 (TRS)	950-1535621
C167	SMD 100NF 25V 10% CER X7R CAP 0805 (TRS)	950-1042621
C168	SMD 100NF 25V 10% CER X7R CAP 0805 (TRS)	950-1042621
C170	SMD 10NF 50V 5% CER.CAP 0805	950-1035501
C171	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751
C172	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751
C173	4.7UF 16V 5MM RADIAL ELECT' CAP TR	155-4751751
C174	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751
C175	SMD 2.2NF 50V 5% CER COG CAP 0805 (TRS)	950-2225501
C177	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C178	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C180	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C181	SMD 68PF 50V 5% CER COG CAP 0805 (TRS)	950-6805501
C184	SMD 68PF 50V 5% CER COG CAP 0805 (TRS)	950-6805501
C201	SMD 33PF 50V 5% CER COG CAP 0805 (TRS)	950-3305501
C202	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C203	1000UF 16V 5MM RAD ELEC' CAP (10X16)	155-1081750
C204	10UF 35V 5MM RADIAL ELECT' CAP TR	155-1063751

C205	SMD 100NF 50V 20/80% CER Y5V CAP 0805 TR	950-1045951
C206	SMD 10NF 50V 5% CER.CAP 0805	950-1035501
C209	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C210	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751
C211	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751
C212	SMD 390PF 50V 5% CER COG CAP 0805 (TRS)	950-3915501
C213	SMD 10PF 50V 5% CER CAP 0805 (TRS)	950-1005501
C215	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C217	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C218	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C219	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C220	SMD 100PF 50V 5% CER COG CAP 0805 (TRS)	950-1015501
C221	SMD 100PF 50V 5% CER COG CAP 0805 (TRS)	950-1015501
C222	SMD 100NF 25V 10% CER X7R CAP 0805 (TRS)	950-1042621
C223	SMD 100NF 25V 10% CER X7R CAP 0805 (TRS)	950-1042621
C224	SMD 100PF 50V 5% CER COG CAP 0805 (TRS)	950-1015501
C225	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C226	22UF 16V 5MM RADIAL ELECT' CAP TR	155-2261751
C227	SMD 180PF 50V 5% CER COG CAP 0805 TR	950-1815501
C228	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751
C230	SMD 0.1W 5% ZEROHM LINK-0805 (TRS)	940-0000501
C231	SMD 220NF 50V 5% CER COG CAP 0805 TRS	950-2245501
C233	SMD 330PF 50V 10% CER COG CAP 0805 (TRS)	950-3315601
C234	1000UF 16V 5MM RAD ELEC' CAP (10X16)	155-1081750
C235	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C236	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C237	SMD 100PF 50V 5% CER COG CAP 0805 (TRS)	950-1015501
C239	1UF 16V 5MM RADIAL ELECT' CAP TR	155-1051751
C240	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C241	SMD 100PF 50V 5% CER COG CAP 0805 (TRS)	950-1015501
C242	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C246	SMD 470NF 16V 20/80 CER Y5V CAP 0805 TRS	950-4741951
C247	SMD 10NF 50V 5% CER.CAP 0805	950-1035501
C248	SMD 390PF 50V 5% CER COG CAP 0805 (TRS)	950-3915501
C250	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C251	1UF 16V 5MM RADIAL ELECT' CAP TR	155-1051751
C253	1UF 16V 5MM RADIAL ELECT' CAP TR	155-1051751
C255	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C256	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C259	SMD 33NF 25V 10% CER X7R CAP 0805 (TRS)	950-3332621
C261	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751
C262	SMD 2.2NF 50V 5% CER COG CAP 0805 (TRS)	950-2225501
C263	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C265	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C266	SMD 15NF 50V 10% CER X7R CAP 0805 (TRS)	950-1535621
C267	SMD 100NF 25V 10% CER X7R CAP 0805 (TRS)	950-1042621
C268	SMD 100NF 25V 10% CER X7R CAP 0805 (TRS)	950-1042621
C270	SMD 10NF 50V 5% CER.CAP 0805	950-1035501
C271	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751
C273	4.7UF 16V 5MM RADIAL ELECT' CAP TR	155-4751751
C274	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751
C275	SMD 2.2NF 50V 5% CER COG CAP 0805 (TRS)	950-2225501
C277	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C278	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C279	SMD 10NF 50V 5% CER.CAP 0805	950-1035501
C280	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C281	SMD 68PF 50V 5% CER COG CAP 0805 (TRS)	950-6805501
C284	SMD 68PF 50V 5% CER COG CAP 0805 (TRS)	950-6805501
C301	SMD 33PF 50V 5% CER COG CAP 0805 (TRS)	950-3305501
C302	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C303	1000UF 16V 5MM RAD ELEC' CAP (10X16)	155-1081750
C304	1UF 35V 5MM RADIAL ELECT' CAP TR	155-1063751
C305	SMD 100NF 50V 20/80% CER Y5V CAP 0805 TR	950-1045951
C306	SMD 10NF 50V 5% CER.CAP 0805	950-1035501
C307	SMD 15PF 50V 5% CER COG CAP 0805 (TRS)	950-1505501
C308	SMD 15PF 50V 5% CER COG CAP 0805 (TRS)	950-1505501
C309	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C310	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751
C311	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751

C312	SMD 390PF 50V 5% CER COG CAP 0805 (TRS)	950-3915501
C313	SMD 10PF 50V 5% CER CAP 0805 (TRS)	950-1005501
C315	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C317	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C318	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C319	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C320	SMD 100PF 50V 5% CER COG CAP 0805 (TRS)	950-1015501
C321	SMD 100PF 50V 5% CER COG CAP 0805 (TRS)	950-1015501
C322	SMD 100NF 25V 10% CER X7R CAP 0805 (TRS)	950-1042621
C323	SMD 100NF 25V 10% CER X7R CAP 0805 (TRS)	950-1042621
C324	SMD 100PF 50V 5% CER COG CAP 0805 (TRS)	950-1015501
C325	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C326	22UF 16V 5MM RADIAL ELECT' CAP TR	155-2261751
C327	SMD 180PF 50V 5% CER COG CAP 0805 TR	950-1815501
C328	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751
C329	470UF 16V 5MM RADIAL ELECT' CAP TR	155-4771751
C330	SMD 0.1W 5% ZEROHM LINK-0805 (TRS)	940-0000501
C331	SMD 220NF 50V 5% CER COG CAP 0805 TRS	950-2245501
C333	SMD 330PF 50V 10% CER COG CAP 0805 (TRS)	950-3315601
C334	1000UF 16V 5MM RAD ELEC' CAP (10X16)	155-1081750
C335	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C336	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C337	SMD 100PF 50V 5% CER COG CAP 0805 (TRS)	950-1015501
C339	1UF 16V 5MM RADIAL ELECT' CAP TR	155-1051751
C340	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C341	SMD 100PF 50V 5% CER COG CAP 0805 (TRS)	950-1015501
C342	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C346	SMD 100NF 25V 10% CER X7R CAP 0805 (TRS)	950-1042621
C347	SMD 10NF 50V 5% CER.CAP 0805	950-1035501
C348	SMD 390PF 50V 5% CER COG CAP 0805 (TRS)	950-3915501
C349	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C350	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C351	1UF 16V 5MM RADIAL ELECT' CAP TR	155-1051751
C353	1UF 16V 5MM RADIAL ELECT' CAP TR	155-1051751
C354	SMD 150PF 50V 5% CER COG CAP 0805 (TRS)	950-1515501
C355	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C356	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C357	220UF 16V 5MM RADIAL ELECT' CAP TR	155-2271751
C359	SMD 33NF 25V 10% CER X7R CAP 0805 (TRS)	950-3332621
C360	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C361	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751
C362	SMD 2.2NF 50V 5% CER COG CAP 0805 (TRS)	950-2225501
C363	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C364	220UF 16V 5MM RADIAL ELECT' CAP TR	155-2271751
C365	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C366	SMD 15NF 50V 10% CER X7R CAP 0805 (TRS)	950-1535621
C367	SMD 100NF 25V 10% CER X7R CAP 0805 (TRS)	950-1042621
C368	SMD 100NF 25V 10% CER X7R CAP 0805 (TRS)	950-1042621
C370	SMD 10NF 50V 5% CER.CAP 0805	950-1035501
C371	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751
C372	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751
C373	4.7UF 16V 5MM RADIAL ELECT' CAP TR	155-4751751
C374	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751
C375	SMD 2.2NF 50V 5% CER COG CAP 0805 (TRS)	950-2225501
C377	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C378	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C379	SMD 10NF 50V 5% CER.CAP 0805	950-1035501
C380	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C381	SMD 68PF 50V 5% CER COG CAP 0805 (TRS)	950-6805501
C384	SMD 68PF 50V 5% CER COG CAP 0805 (TRS)	950-6805501
C401	SMD 33PF 50V 5% CER COG CAP 0805 (TRS)	950-3305501
C402	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C403	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C404	10UF 35V 5MM RADIAL ELECT' CAP TR	155-1063751
C405	SMD 100NF 50V 20/80% CER Y5V CAP 0805 TR	950-1045951
C406	SMD 10NF 50V 5% CER.CAP 0805	950-1035501
C409	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C410	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751
C411	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751



C412	SMD 390PF 50V 5% CER COG CAP 0805 (TRS)	950-3915501
C413	SMD 10PF 50V 5% CER CAP 0805 (TRS)	950-1005501
C415	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C417	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C418	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C419	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C420	SMD 100PF 50V 5% CER COG CAP 0805 (TRS)	950-1015501
C421	SMD 100PF 50V 5% CER COG CAP 0805 (TRS)	950-1015501
C422	SMD 100NF 25V 10% CER X7R CAP 0805 (TRS)	950-1042621
C423	SMD 100NF 25V 10% CER X7R CAP 0805 (TRS)	950-1042621
C424	SMD 100PF 50V 5% CER COG CAP 0805 (TRS)	950-1015501
C425	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C426	22UF 16V 5MM RADIAL ELECT' CAP TR	155-2261751
C427	SMD 180PF 50V 5% CER COG CAP 0805 TR	950-1815501
C428	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751
C430	SMD 0.1W 5% ZEROHM LINK-0805 (TRS)	940-0000501
C431	SMD 220NF 50V 5% CER COG CAP 0805 TRS	950-2245501
C433	SMD 330PF 50V 10% CER COG CAP 0805 (TRS)	950-3315601
C434	1000UF 16V 5MM RAD ELEC' CAP (10X16)	155-1081750
C435	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C436	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C437	SMD 100PF 50V 5% CER COG CAP 0805 (TRS)	950-1015501
C439	1UF 16V 5MM RADIAL ELECT' CAP TR	155-1051751
C440	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C441	SMD 100PF 50V 5% CER COG CAP 0805 (TRS)	950-1015501
C442	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C445	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C446	SMD 100NF 25V 10% CER X7R CAP 0805 (TRS)	950-1042621
C447	SMD 10NF 50V 5% CER.CAP 0805	950-1035501
C448	SMD 390PF 50V 5% CER COG CAP 0805 (TRS)	950-3915501
C449	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C451	1UF 16V 5MM RADIAL ELECT' CAP TR	155-1051751
C453	1UF 16V 5MM RADIAL ELECT' CAP TR	155-1051751
C456	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C459	SMD 33NF 25V 10% CER X7R CAP 0805 (TRS)	950-3332621
C461	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751
C462	SMD 2.2NF 50V 5% CER COG CAP 0805 (TRS)	950-2225501
C463	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C465	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C466	SMD 15NF 50V 10% CER X7R CAP 0805 (TRS)	950-1535621
C467	SMD 100NF 25V 10% CER X7R CAP 0805 (TRS)	950-1042621
C468	SMD 100NF 25V 10% CER X7R CAP 0805 (TRS)	950-1042621
C470	SMD 10NF 50V 5% CER.CAP 0805	950-1035501
C471	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751
C473	4.7UF 16V 5MM RADIAL ELECT' CAP TR	155-4751751
C474	47UF 16V 5MM RADIAL ELECT' CAP TR	155-4761751
C475	SMD 2.2NF 50V 5% CER COG CAP 0805 (TRS)	950-2225501
C477	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C478	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C479	SMD 10NF 50V 5% CER.CAP 0805	950-1035501
C480	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C481	SMD 68PF 50V 5% CER COG CAP 0805 (TRS)	950-6805501
C483	1000UF 16V 5MM RAD ELEC' CAP (10X16)	155-1081750
C484	SMD 68PF 50V 5% CER COG CAP 0805 (TRS)	950-6805501

## Diodes

D1	DIODE-1N4007 TR	120-0400701
D2	DIODE-1N4007 TR	120-0400701
D3	DIODE-1N4007 TR	120-0400701
D4	DIODE-1N4007 TR	120-0400701
D5	DIODE-BYW96D (PHILIPS) TR	120-0009611
D6	DIODE-BYW96D (PHILIPS) TR	120-0009611
D7	SIGNAL DIODE-1N4148 75MA 75V TR	120-0414801
D8	SIGNAL DIODE-1N4148 75MA 75V TR	120-0414801
D9	SIGNAL DIODE-1N4148 75MA 75V TR	120-0414801
D10	3V9 5% 400MW ZENER DIODE TR	125-0039501
D11	DIODE-BYV95A (PHILIPS) TR	120-0009511
D12	DIODE-BYV95A (PHILIPS) TR	120-0009511

D13	DIODE-BYW98-50TR	120-0009801
D14	DIODE-BYW98-50TR	120-0009801
D15	DIODE-1N4007 TR	120-0400701
D16	DIODE-1N4007 TR	120-0400701
D17	DIODE-1N4007 TR	120-0400701
D18	9V1 5% 1.3W ZENER DIODE TR	125-0091531
D19	SIGNAL DIODE-1N4148 75MA 75V TR	120-0414801
D20	9V1 5% 400MW ZENER DIODE TR	125-0091501
D21	9V1 5% 400MW ZENER DIODE TR	125-0091501
D25	SIGNAL DIODE-1N4148 75MA 75V TR	120-0414801
D100	DIODE-1N4007 TR	120-0400701
D101	9V1 5% 400MW ZENER DIODE TR	125-0091501
D102	9V1 5% 400MW ZENER DIODE TR	125-0091501
D103	SMD DIODE-BB619 MINI PLAST (TRS))	912-0061901
D104	SIGNAL DIODE-1N4148 75MA 75V TR	120-0414801
D105	SIGNAL DIODE-1N4148 75MA 75V TR	120-0414801
D106	9V1 5% 400MW ZENER DIODE TR	125-0091501
D107	9V1 5% 400MW ZENER DIODE TR	125-0091501
D108	4V7 5% 400MW ZENER DIODE TR	125-0047501
D200	DIODE-1N4007 TR	120-0400701
D201	9V1 5% 400MW ZENER DIODE TR	125-0091501
D202	9V1 5% 400MW ZENER DIODE TR	125-0091501
D203	SMD DIODE-BB619 MINI PLAST (TRS))	912-0061901
D204	SIGNAL DIODE-1N4148 75MA 75V TR	120-0414801
D205	SIGNAL DIODE-1N4148 75MA 75V TR	120-0414801
D206	9V1 5% 400MW ZENER DIODE TR	125-0091501
D207	9V1 5% 400MW ZENER DIODE TR	125-0091501
D208	4V7 5% 400MW ZENER DIODE TR	125-0047501
D301	9V1 5% 400MW ZENER DIODE TR	125-0091501
D302	9V1 5% 400MW ZENER DIODE TR	125-0091501
D303	SMD DIODE-BB619 MINI PLAST (TRS))	912-0061901
D304	SIGNAL DIODE-1N4148 75MA 75V TR	120-0414801
D305	SIGNAL DIODE-1N4148 75MA 75V TR	120-0414801
D306	9V1 5% 400MW ZENER DIODE TR	125-0091501
D307	9V1 5% 400MW ZENER DIODE TR	125-0091501
D308	4V7 5% 400MW ZENER DIODE TR	125-0047501
D401	9V1 5% 400MW ZENER DIODE TR	125-0091501
D402	9V1 5% 400MW ZENER DIODE TR	125-0091501
D403	SMD DIODE-BB619 MINI PLAST (TRS))	912-0061901
D404	SIGNAL DIODE-1N4148 75MA 75V TR	120-0414801
D405	SIGNAL DIODE-1N4148 75MA 75V TR	120-0414801
D406	9V1 5% 400MW ZENER DIODE TR	125-0091501
D407	9V1 5% 400MW ZENER DIODE TR	125-0091501
D408	4V7 5% 400MW ZENER DIODE TR	125-0047501

## Inductances

L1	INDUCTOR-1A 100UH (TDK TSL1110-101K1RO)	131-1000500
L2	INDUCTOR-1A 100UH (TDK TSL1110-101K1RO)	131-1000500
L3	INDUCTOR-1A 100UH (TDK TSL1110-101K1RO)	131-1000500
L4	15UH 5% AXIAL INDUCTOR TR	130-0150501
L5	AXIAL INDUCTOR-82UH5% TR	130-0820501
L6	INDUCTOR-1A 100UH (TDK TSL1110-101K1RO)	131-1000500
L100	AXIAL INDUCTOR-27UH5% TR	130-0270501
L101	AXIAL INDUCTOR-47UH5% TR	130-0470501
L102	TINNED COPPER WIRE LINKS 0.61MM DIA.(TRS	999-1099901
L104	TINNED COPPER WIRE LINKS 0.61MM DIA.(TRS	999-1099901
L105	10.7MHZ +-3% ADJ COILTYPE FH-7	133-2868704
L106	10.7MHZ +-3% ADJ COILTYPE FH-7	133-2868704
L107	10.7MHZ +-3% ADJ COILTYPE FH-7	133-2868704
L108	2U2H 5% AXIAL INDUCTOR TR	130-0022501
L200	AXIAL INDUCTOR-27UH5% TR	130-0270501
L201	AXIAL INDUCTOR-47UH5% TR	130-0470501
L202	TINNED COPPER WIRE LINKS 0.61MM DIA.(TRS	999-1099901
L204	TINNED COPPER WIRE LINKS 0.61MM DIA.(TRS	999-1099901
L205	10.7MHZ +-3% ADJ COILTYPE FH-7	133-2868704
L206	10.7MHZ +-3% ADJ COILTYPE FH-7	133-2868704
L207	10.7MHZ +-3% ADJ COILTYPE FH-7	133-2868704
L208	2U2H 5% AXIAL INDUCTOR TR	130-0022501

L300	AXIAL INDUCTOR-27UH5% TR	130-0270501
L301	AXIAL INDUCTOR-47UH5% TR	130-0470501
L302	TINNED COPPER WIRE LINKS 0.61MM DIA.(TRS	999-1099901
L304	TINNED COPPER WIRE LINKS 0.61MM DIA.(TRS	999-1099901
L305	10.7MHZ +-3% ADJ COILTYPE FH-7	133-2868704
L306	10.7MHZ +-3% ADJ COILTYPE FH-7	133-2868704
L307	10.7MHZ +-3% ADJ COILTYPE FH-7	133-2868704
L308	2U2H 5% AXIAL INDUCTORTR	130-0022501
L400	AXIAL INDUCTOR-27UH5% TR	130-0270501
L401	AXIAL INDUCTOR-47UH5% TR	130-0470501
L402	TINNED COPPER WIRE LINKS 0.61MM DIA.(TRS	999-1099901
L404	TINNED COPPER WIRE LINKS 0.61MM DIA.(TRS	999-1099901
L405	10.7MHZ +-3% ADJ COILTYPE FH-7	133-2868704
L406	10.7MHZ +-3% ADJ COILTYPE FH-7	133-2868704
L407	10.7MHZ +-3% ADJ COILTYPE FH-7	133-2868704
L408	2U2H 5% AXIAL INDUCTORTR	130-0022501

## Wire Links

LK1-287	TINNED COPP. WIRE LINKS 0.61MM DIA.(TRS)	999-1099901
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## Connectors

PL100	PIN HEADER-3 WAY 0.1 PITCH TIN	161-1000300
PL200	PIN HEADER-3 WAY 0.1 PITCH TIN	161-1000300
PL300	PIN HEADER-3 WAY 0.1 PITCH TIN	161-1000300
PL400	PIN HEADER-3 WAY 0.1 PITCH TIN	161-1000300
SK1	*A* LEONHARDY 07-78.2300 MAINS INPUT SKT	875-0778231
SK2	PHONO SOCKET-DUAL (JALCO YKC21-0061)	165-2000201
SK100	SCART SOCKET-MKF6341 (NO LUGS)	163-2102112
SK200	SCART SOCKET-MKF6341 (NO LUGS)	163-2102112
SK300	SCART SOCKET-MKF6341 (NO LUGS)	163-2102112
SK400	SCART SOCKET-MKF6341 (NO LUGS)	163-2102112

## Transistors

Q1	TRANSISTOR-MJE 18004 (MOTOROLA)	110-1800401
Q2	TRANSISTOR-ZVN3306A FET TO-92 PACKAGE	110-0330601
Q3	TRANSISTOR-BC557 PNP TO-92 PACKAGETR	110-0055701
Q4	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q5	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q6	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q7	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q8	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q100	TRANSISTOR-ZVN3306A FET TO-92 PACKAGE	110-0330601
Q101	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q102	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q103	TRANSISTOR-BC557 PNP TO-92 PACKAGE TR	110-0055701
Q104	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q105	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q106	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q107	TRANSISTOR-BC557 PNP TO-92 PACKAGE TR	110-0055701
Q108	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q109	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q110	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q111	TRANSISTOR-BC557 PNP TO-92 PACKAGE TR	110-0055701
Q112	TRANSISTOR-BC557 PNP TO-92 PACKAGET R	110-0055701
Q113	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q114	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q115	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q116	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q118	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q119	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q200	TRANSISTOR-ZVN3306A FET TO-92 PACKAGE	110-0330601
Q201	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q202	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q203	TRANSISTOR-BC557 PNP TO-92 PACKAGE TR	110-0055701
Q204	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q205	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701

Q206	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q207	TRANSISTOR-BC557 PNP TO-92 PACKAGE TR	110-0055701
Q208	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q209	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q210	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q211	TRANSISTOR-BC557 PNP TO-92 PACKAGE TR	110-0055701
Q212	TRANSISTOR-BC557 PNP TO-92 PACKAGE TR	110-0055701
Q213	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q214	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q215	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q216	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q218	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q219	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q300	TRANSISTOR-ZVN3306A FET TO-92 PACKAGE	110-0330601
Q301	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q302	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q303	TRANSISTOR-BC557 PNP TO-92 PACKAGE TR	110-0055701
Q304	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q305	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q306	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q307	TRANSISTOR-BC557 PNP TO-92 PACKAGE TR	110-0055701
Q308	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q309	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q310	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q311	TRANSISTOR-BC557 PNP TO-92 PACKAGE TR	110-0055701
Q312	TRANSISTOR-BC557 PNP TO-92 PACKAGE TR	110-0055701
Q313	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q314	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q315	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q316	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q318	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q319	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q400	TRANSISTOR-ZVN3306A FET TO-92 PACKAGE	110-0330601
Q401	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q402	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q403	TRANSISTOR-BC557 PNP TO-92 PACKAGE TR	110-0055701
Q404	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q405	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q406	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q407	TRANSISTOR-BC557 PNP TO-92 PACKAGE TR	110-0055701
Q408	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q409	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q410	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q411	TRANSISTOR-BC557 PNP TO-92 PACKAGE TR	110-0055701
Q412	TRANSISTOR-BC557 PNP TO-92 PACKAGE TR	110-0055701
Q413	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q414	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q415	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q416	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q418	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701
Q419	TRANSISTOR-BC547B NPN TO-92 PACKAGE TR	110-1054701

## Resistors

R1	10R 2W 10% METOX NON-SPIRAL RES	143-1007621
R2	100K 2W 5% METAL FILM RES TR	142-1046511
R3	2K2 2W 5% METAL FILM RES TR	142-2226511
R4	1K 5W 10% AX/PLUG CER CASE RES	145-1029600
R5	SMD 220R 0.1W 5% RES 0805 (TRS)	940-2210501
R6	1R 1WATT 5% METOX NON-SPIRAL RES	143-0106521
R7	SMD 4K7 0.1W 5% RES 0805 (TRS)	940-4720501
R8	SMD 1K 0.1W 1% RES 0805 (TRS)	940-1020101
R9	15R 0.25W 5% CARBON FILM RES TR	140-1502501
R10	SMD 2K 0.1W 1% RES 0805 (TRS)	940-2020101
R11	SMD 22K 0.1W 5% RES 0805 (TRS)	940-2230501
R12	SMD 47K 0.1W 5% RES 0805 (TRS)	940-4730501
R13	100R 0.25W 5% CARBON FILM RES TR	140-1012501
R14	15R 0.25W 5% CARBON FILM RES TR	140-1502501
R15	68R 0.25W 5% CARBON FILM RES TR	140-6802501

R16	SMD 22K 0.1W 5% RES 0805 (TRS)	940-2230501	R88	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501
R17	4R7 0.25W 5% CARBON FILM RES TR	140-0472501	R89	SMD 560R 0.1W 5% RES 0805 (TRS)	940-5610501
R18	470R 0.25W 1% METAL FILM RES	141-4712101	R90	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501
R19	470R 0.25W 1% METAL FILM RES	141-4712101	R91	SMD 4K7 0.1W 5% RES 0805 (TRS)	940-4720501
R20	*A* 10M 0.5W VR37 METAL FILM RES (TR)	142-1065511	R92	SMD 4K7 0.1W 5% RES 0805 (TRS)	940-4720501
R21	SMD 15K 0.1W 5% RES 0805 (TRS)	940-1530501	R93	SMD 470R 0.1W 5% RES 0805 (TRS)	940-4710501
R22	TINNED COPPER WIRE LINKS 0.61MM DIA.(TRS)	999-1099901	R94	SMD 4K7 0.1W 5% RES 0805 (TRS)	940-4720501
R23	SMD 2K7 0.1W 5% RES 0805 (TRS)	940-2720501	R95	SMD 8K2 0.1W 5% RES 0805 (TRS)	940-8220501
R24	SMD 2K2 0.1W 5% RES 0805 (TRS)	940-2220501	R100	SMD 100K 0.1W 5% RES 0805 (TRS)	940-1040501
R25	SMD 1K5 0.1W 5% RES 0805 (TRS)	940-1520501	R101	SMD 82K 0.1W 5% RES 0805 (TRS)	940-8230501
R26	SMD 3K3 0.1W 5% RES 0805 (TRS)	940-3320501	R102	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501
R27	SMD 3K3 0.1W 5% RES 0805 (TRS)	940-3320501	R103	SMD 5K6 0.1W 1% RES 0805 (TRS)	940-5620101
R28	SMD 1K2 0.1W 5% RES 0805 (TRS)	940-1220501	R104	SMD 2K2 0.1W 5% RES 0805 (TRS)	940-2220501
R29	SMD 2K2 0.1W 5% RES 0805 (TRS)	940-2220501	R105	SMD 2K2 0.1W 5% RES 0805 (TRS)	940-2220501
R30	SMD 1K2 0.1W 5% RES 0805 (TRS)	940-1220501	R106	SMD 75R 0.1W 5% RES 0805 (TRS)	940-7500501
R31	SMD 2K49 0.1W 1% RES 0805 (TRS)	940-2490191	R107	SMD 100R 0.1W 5% RES 0805 (TRS)	940-1010501
R32	SMD 1K8 0.1W 5% RES 0805 (TRS)	940-1820501	R108	SMD 75R 0.1W 5% RES 0805 (TRS)	940-7500501
R33	SMD 2K49 0.1W 1% RES 0805 (TRS)	940-2490191	R109	SMD 680R 0.1W 5% RES 0805 (TRS)	940-6810501
R34	SMD 2K2 0.1W 5% RES 0805 (TRS)	940-2220501	R110	SMD 1K 0.1W 5% RES 0805 (TRS)	940-1020501
R35	SMD 1K5 0.1W 5% RES 0805 (TRS)	940-1520501	R111	SMD 1M 0.1W 5% RES 0805 (TRS)	940-1050501
R36	SMD 4K7 0.1W 5% RES 0805 (TRS)	940-4720501	R112	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501
R37	SMD 4K7 0.1W 5% RES 0805 (TRS)	940-4720501	R113	SMD 470R 0.1W 5% RES 0805 (TRS)	940-4710501
R38	SMD 1K5 0.1W 5% RES 0805 (TRS)	940-1520501	R114	SMD 100R 0.1W 5% RES 0805 (TRS)	940-1010501
R39	SMD 470R 0.1W 5% RES 0805 (TRS)	940-4710501	R115	SMD 2K7 0.1W 5% RES 0805 (TRS)	940-2720501
R40	SMD 68K 0.1W 5% RES 0805 (TRS)	940-6830501	R116	SMD 910R 0.1W 5% RES 0805 (TRS)	940-9110501
R41	SMD 680R 0.1W 5% RES 0805 (TRS)	940-6810501	R117	SMD 270R 0.1W 5% RES 0805 (TRS)	940-2710501
R42	SMD 1K5 0.1W 5% RES 0805 (TRS)	940-1520501	R118	SMD 1K 0.1W 1% RES 0805 (TRS)	940-1020101
R43	SMD 1K8 0.1W 5% RES 0805 (TRS)	940-1820501	R119	SMD 270R 0.1W 1% RES 0805 TR	940-2710101
R44	SMD 1K5 0.1W 5% RES 0805 (TRS)	940-1520501	R120	SMD 1K 0.1W 5% RES 0805 (TRS)	940-1020501
R46	SMD 4K3 0.1W 1% RES 0805 (TRS)	940-4320101	R121	SMD 750R 0.1W 1% RES 0805 TR	940-7510101
R47	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501	R122	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501
R48	SMD 2K7 0.1W 5% RES 0805 (TRS)	940-2720501	R123	SMD 270R 0.1W 5% RES 0805 (TRS)	940-2710501
R49	SMD 2K7 0.1W 5% RES 0805 (TRS)	940-2720501	R124	SMD 1K 0.1W 5% RES 0805 (TRS)	940-1020501
R50	SMD 2K7 0.1W 5% RES 0805 (TRS)	940-2720501	R125	SMD 1K 0.1W 5% RES 0805 (TRS)	940-1020501
R51	SMD 100K 0.1W 5% RES 0805 (TRS)	940-1040501	R126	SMD 270R 0.1W 5% RES 0805 (TRS)	940-2710501
R52	SMD 2K7 0.1W 5% RES 0805 (TRS)	940-2720501	R127	SMD 270K 0.1W 5% RES 0805 (TRS)	940-2740501
R53	SMD 4K7 0.1W 5% RES 0805 (TRS)	940-4720501	R128	SMD 470R 0.1W 5% RES 0805 (TRS)	940-4710501
R54	SMD 470K 0.1W 5% RES 0805 (TRS)	940-4740501	R129	SMD 4K7 0.1W 5% RES 0805 (TRS)	940-4720501
R55	SMD 100K 0.1W 5% RES 0805 (TRS)	940-1040501	R130	SMD 3K9 0.1W 5% RES 0805 (TRS)	940-3920501
R56	SMD 470R 0.1W 5% RES 0805 (TRS)	940-4710501	R131	SMD 12K 0.1W 5% RES 0805 (TRS)	940-1230501
R57	SMD 3K3 0.1W 1% RES 0805 (TRS)	940-3320101	R132	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501
R58	SMD 2K2 0.1W 5% RES 0805 (TRS)	940-2220501	R133	SMD 2K7 0.1W 5% RES 0805 (TRS)	940-2720501
R59	SMD 4K7 0.1W 5% RES 0805 (TRS)	940-4720501	R134	SMD 100R 0.1W 5% RES 0805 (TRS)	940-1010501
R60	SMD 2K7 0.1W 5% RES 0805 (TRS)	940-2720501	R135	SMD 470R 0.1W 5% RES 0805 (TRS)	940-4710501
R61	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501	R136	SMD 470R 0.1W 5% RES 0805 (TRS)	940-4710501
R62	SMD 8K2 0.1W 5% RES 0805 (TRS)	940-8220501	R137	SMD 560R 0.1W 5% RES 0805 (TRS)	940-5610501
R63	SMD 1K 0.1W 5% RES 0805 (TRS)	940-1020501	R139	SMD 180R 0.1W 5% RES 0805 (TRS)	940-1810501
R64	SMD 1K 0.1W 5% RES 0805 (TRS)	940-1020501	R141	SMD 220R 0.1W 5% RES 0805 (TRS)	940-2210501
R65	SMD 56R 0.1W 5% RES 0805 (TRS)	940-5600501	R142	SMD 100R 0.1W 5% RES 0805 (TRS)	940-1010501
R67	SMD 2K2 0.1W 5% RES 0805 (TRS)	940-2220501	R143	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501
R68	SMD 2K2 0.1W 5% RES 0805 (TRS)	940-2220501	R144	SMD 1K8 0.1W 5% RES 0805 (TRS)	940-1820501
R69	SMD 10K 0.1W 5% RES 0805 (TRS)	940-1030501	R145	SMD 1K 0.1W 5% RES 0805 (TRS)	940-1020501
R70	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501	R146	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501
R71	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501	R147	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501
R72	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501	R148	SMD 4K7 0.1W 5% RES 0805 (TRS)	940-4720501
R73	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501	R149	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501
R74	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501	R150	SMD 1K 0.1W 5% RES 0805 (TRS)	940-1020501
R75	SMD 4K7 0.1W 5% RES 0805 (TRS)	940-4720501	R151	SMD 680R 0.1W 5% RES 0805 (TRS)	940-6810501
R76	SMD 4K7 0.1W 5% RES 0805 (TRS)	940-4720501	R152	SMD 680R 0.1W 5% RES 0805 (TRS)	940-6810501
R77	SMD 4K7 0.1W 5% RES 0805 (TRS)	940-4720501	R153	SMD 680R 0.1W 5% RES 0805 (TRS)	940-6810501
R79	SMD 4K7 0.1W 5% RES 0805 (TRS)	940-4720501	R154	SMD 0.1W 5% ZEROHM LINK-0805 (TRS)	940-0000501
R80	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501	R155	SMD 470R 0.1W 5% RES 0805 (TRS)	940-4710501
R81	SMD 4K7 0.1W 5% RES 0805 (TRS)	940-4720501	R158	SMD 4K7 0.1W 5% RES 0805 (TRS)	940-4720501
R82	SMD 270R 0.1W 5% RES 0805 (TRS)	940-2710501	R159	SMD 470R 0.1W 5% RES 0805 (TRS)	940-4710501
R83	SMD 4K7 0.1W 5% RES 0805 (TRS)	940-4720501	R160	SMD 470R 0.1W 5% RES 0805 (TRS)	940-4710501
R84	SMD 4K7 0.1W 5% RES 0805 (TRS)	940-4720501	R161	SMD 390R 0.1W 5% RES 0805 (TRS)	940-3910501
R85	SMD 4K7 0.1W 5% RES 0805 (TRS)	940-4720501	R162	SMD 15K 0.1W 5% RES 0805 (TRS)	940-1530501
R86	SMD 4K7 0.1W 5% RES 0805 (TRS)	940-4720501	R163	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501
R87	SMD 560R 0.1W 5% RES 0805 (TRS)	940-5610501	R164	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501

R165 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R166 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R167 SMD 47K 0.1W 5% RES 0805 (TRS)  
 R168 SMD 4K7 0.1W 5% RES 0805 (TRS)  
 R169 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R170 SMD 56K 0.1W 5% RES 0805 (TRS)  
 R172 SMD 100K 0.1W 5% RES 0805 (TRS)  
 R173 SMD 1K 0.1W 5% RES 0805 (TRS)  
 R174 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R175 SMD 47K 0.1W 5% RES 0805 (TRS)  
 R176 SMD 4M7 0.1W 5% RES 0805 (TRS)  
 R177 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R178 SMD 330K 0.1W 5% RES 0805 (TRS)  
 R179 SMD 470K 0.1W 5% RES 0805 (TRS)  
 R180 SMD 1K 0.1W 5% RES 0805 (TRS)  
 R181 SMD 4K7 0.1W 5% RES 0805 (TRS)  
 R182 SMD 390R 0.1W 5% RES 0805 (TRS)  
 R184 SMD 1K 0.1W 5% RES 0805 (TRS)  
 R185 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R186 SMD 15K 0.1W 5% RES 0805 (TRS)  
 R187 SMD 1K 0.1W 5% RES 0805 (TRS)  
 R188 SMD 4K7 0.1W 5% RES 0805 (TRS)  
 R189 SMD 0.1W 5% ZEROHM LINK-0805 (TRS)  
 R190 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R191 SMD 1K2 0.1W 5% RES 0805 (TRS)  
 R192 SMD 4K7 0.1W 5% RES 0805 (TRS)  
 R193 SMD 6K8 0.1W 5% RES 0805 (TRS)  
 R194 SMD 1K 0.1W 5% RES 0805 (TRS)  
 R195 SMD 22K 0.1W 5% RES 0805 (TRS)  
 R197 SMD 1M 0.1W 5% RES 0805 (TRS)  
 R198 SMD 2K7 0.1W 1% RES 0805 (TRS)  
 R199 SMD 1K8 0.1W 1% RES 0805 (TRS)  
 R200 SMD 100K 0.1W 5% RES 0805 (TRS)  
 R201 SMD 82K 0.1W 5% RES 0805 (TRS)  
 R202 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R203 SMD 5K6 0.1W 1% RES 0805 (TRS)  
 R204 SMD 2K2 0.1W 5% RES 0805 (TRS)  
 R205 SMD 2K2 0.1W 5% RES 0805 (TRS)  
 R206 SMD 75R 0.1W 5% RES 0805 (TRS)  
 R207 SMD 100R 0.1W 5% RES 0805 (TRS)  
 R208 SMD 75R 0.1W 5% RES 0805 (TRS)  
 R209 SMD 680R 0.1W 5% RES 0805 (TRS)  
 R210 SMD 1K 0.1W 5% RES 0805 (TRS)  
 R211 SMD 1M 0.1W 5% RES 0805 (TRS)  
 R212 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R213 SMD 470R 0.1W 5% RES 0805 (TRS)  
 R214 SMD 100R 0.1W 5% RES 0805 (TRS)  
 R215 SMD 2K7 0.1W 5% RES 0805 (TRS)  
 R216 SMD 910R 0.1W 5% RES 0805 (TRS)  
 R217 SMD 270R 0.1W 5% RES 0805 (TRS)  
 R218 SMD 1K 0.1W 1% RES 0805 (TRS)  
 R219 SMD 270R 0.1W 1% RES 0805 TR  
 R220 SMD 1K 0.1W 5% RES 0805 (TRS)  
 R221 SMD 750R 0.1W 1% RES 0805 TR  
 R222 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R223 SMD 270R 0.1W 5% RES 0805 (TRS)  
 R224 SMD 1K 0.1W 5% RES 0805 (TRS)  
 R225 SMD 1K 0.1W 5% RES 0805 (TRS)  
 R226 SMD 270R 0.1W 5% RES 0805 (TRS)  
 R227 SMD 270K 0.1W 5% RES 0805 (TRS)  
 R228 SMD 470R 0.1W 5% RES 0805 (TRS)  
 R229 SMD 4K7 0.1W 5% RES 0805 (TRS)  
 R230 SMD 3K9 0.1W 5% RES 0805 (TRS)  
 R231 SMD 12K 0.1W 5% RES 0805 (TRS)  
 R232 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R233 SMD 2K7 0.1W 5% RES 0805 (TRS)  
 R234 SMD 100R 0.1W 5% RES 0805 (TRS)  
 R235 SMD 470R 0.1W 5% RES 0805 (TRS)  
 R236 SMD 470R 0.1W 5% RES 0805 (TRS)

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 940-4710501

R237 SMD 560R 0.1W 5% RES 0805 (TRS)  
 R239 SMD 180R 0.1W 5% RES 0805 (TRS)  
 R241 SMD 220R 0.1W 5% RES 0805 (TRS)  
 R242 SMD 100R 0.1W 5% RES 0805 (TRS)  
 R243 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R244 SMD 1K8 0.1W 5% RES 0805 (TRS)  
 R245 SMD 1K 0.1W 5% RES 0805 (TRS)  
 R246 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R247 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R248 SMD 4K7 0.1W 5% RES 0805 (TRS)  
 R249 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R250 SMD 1K 0.1W 5% RES 0805 (TRS)  
 R251 SMD 680R 0.1W 5% RES 0805 (TRS)  
 R252 SMD 680R 0.1W 5% RES 0805 (TRS)  
 R253 SMD 680R 0.1W 5% RES 0805 (TRS)  
 R254 SMD 0.1W 5% ZEROHM LINK-0805 (TRS)  
 R255 SMD 470R 0.1W 5% RES 0805 (TRS)  
 R259 SMD 470R 0.1W 5% RES 0805 (TRS)  
 R260 SMD 470R 0.1W 5% RES 0805 (TRS)  
 R261 SMD 390R 0.1W 5% RES 0805 (TRS)  
 R262 SMD 15K 0.1W 5% RES 0805 (TRS)  
 R263 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R264 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R265 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R266 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R267 SMD 47K 0.1W 5% RES 0805 (TRS)  
 R268 SMD 4K7 0.1W 5% RES 0805 (TRS)  
 R269 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R270 SMD 56K 0.1W 5% RES 0805 (TRS)  
 R272 SMD 100K 0.1W 5% RES 0805 (TRS)  
 R273 SMD 1K 0.1W 5% RES 0805 (TRS)  
 R274 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R275 SMD 47K 0.1W 5% RES 0805 (TRS)  
 R276 SMD 4M7 0.1W 5% RES 0805 (TRS)  
 R277 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R278 SMD 330K 0.1W 5% RES 0805 (TRS)  
 R280 SMD 1K 0.1W 5% RES 0805 (TRS)  
 R281 SMD 4K7 0.1W 5% RES 0805 (TRS)  
 R282 SMD 390R 0.1W 5% RES 0805 (TRS)  
 R284 SMD 1K 0.1W 5% RES 0805 (TRS)  
 R285 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R286 SMD 15K 0.1W 5% RES 0805 (TRS)  
 R287 SMD 1K 0.1W 5% RES 0805 (TRS)  
 R288 SMD 4K7 0.1W 5% RES 0805 (TRS)  
 R289 SMD 0.1W 5% ZEROHM LINK-0805 (TRS)  
 R290 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R291 SMD 1K2 0.1W 5% RES 0805 (TRS)  
 R292 SMD 4K7 0.1W 5% RES 0805 (TRS)  
 R293 SMD 6K8 0.1W 5% RES 0805 (TRS)  
 R294 SMD 1K 0.1W 5% RES 0805 (TRS)  
 R295 SMD 22K 0.1W 5% RES 0805 (TRS)  
 R297 SMD 1M 0.1W 5% RES 0805 (TRS)  
 R298 SMD 2K7 0.1W 1% RES 0805 (TRS)  
 R299 SMD 1K8 0.1W 1% RES 0805 (TRS)  
 R300 SMD 100K 0.1W 5% RES 0805 (TRS)  
 R301 SMD 82K 0.1W 5% RES 0805 (TRS)  
 R302 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R303 SMD 5K6 0.1W 1% RES 0805 (TRS)  
 R304 SMD 2K2 0.1W 5% RES 0805 (TRS)  
 R305 SMD 2K2 0.1W 5% RES 0805 (TRS)  
 R306 SMD 75R 0.1W 5% RES 0805 (TRS)  
 R307 SMD 100R 0.1W 5% RES 0805 (TRS)  
 R308 SMD 75R 0.1W 5% RES 0805 (TRS)  
 R309 SMD 680R 0.1W 5% RES 0805 (TRS)  
 R310 SMD 1K 0.1W 5% RES 0805 (TRS)  
 R311 SMD 1M 0.1W 5% RES 0805 (TRS)  
 R312 SMD 10K 0.1W 5% RES-0805 (TRS)  
 R313 SMD 470R 0.1W 5% RES 0805 (TRS)  
 R314 SMD 100R 0.1W 5% RES 0805 (TRS)

940-5610501  
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R315	SMD 2K7	0.1W	5% RES 0805 (TRS)	940-2720501	R391	SMD 1K2	0.1W	5% RES 0805 (TRS)	940-1220501
R316	SMD 910R	0.1W	5% RES 0805 (TRS)	940-9110501	R392	SMD 4K7	0.1W	5% RES 0805 (TRS)	940-4720501
R317	SMD 270R	0.1W	5% RES 0805 (TRS)	940-2710501	R393	SMD 6K8	0.1W	5% RES 0805 (TRS)	940-6820501
R318	SMD 1K	0.1W	1% RES 0805 (TRS)	940-1020101	R394	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501
R319	SMD 270R	0.1W	1% RES 0805 TR	940-2710101	R395	SMD 22K	0.1W	5% RES 0805 (TRS)	940-2230501
R320	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501	R397	SMD 1M	0.1W	5% RES 0805 (TRS)	940-1050501
R321	SMD 750R	0.1W	1% RES 0805 TR	940-7510101	R398	SMD 2K7	0.1W	1% RES 0805 (TRS)	940-2720101
R322	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501	R399	SMD 1K8	0.1W	1% RES 0805 (TRS)	940-1820101
R323	SMD 270R	0.1W	5% RES 0805 (TRS)	940-2710501	R400	SMD 100K	0.1W	5% RES 0805 (TRS)	940-1040501
R324	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501	R401	SMD 82K	0.1W	5% RES 0805 (TRS)	940-8230501
R325	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501	R402	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R326	SMD 270R	0.1W	5% RES 0805 (TRS)	940-2710501	R403	SMD 5K6	0.1W	1% RES 0805 (TRS)	940-5620101
R327	SMD 270K	0.1W	5% RES 0805 (TRS)	940-2740501	R404	SMD 2K2	0.1W	5% RES 0805 (TRS)	940-2220501
R328	SMD 470R	0.1W	5% RES 0805 (TRS)	940-4710501	R405	SMD 2K2	0.1W	5% RES 0805 (TRS)	940-2220501
R329	SMD 4K7	0.1W	5% RES 0805 (TRS)	940-4720501	R406	SMD 75R	0.1W	5% RES 0805 (TRS)	940-7500501
R330	SMD 3K9	0.1W	5% RES 0805 (TRS)	940-3920501	R407	SMD 100R	0.1W	5% RES 0805 (TRS)	940-1010501
R331	SMD 12K	0.1W	5% RES 0805 (TRS)	940-1230501	R408	SMD 75R	0.1W	5% RES 0805 (TRS)	940-7500501
R332	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501	R409	SMD 680R	0.1W	5% RES 0805 (TRS)	940-6810501
R333	SMD 2K7	0.1W	5% RES 0805 (TRS)	940-2720501	R410	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501
R334	SMD 100R	0.1W	5% RES 0805 (TRS)	940-1010501	R411	SMD 1M	0.1W	5% RES 0805 (TRS)	940-1050501
R335	SMD 470R	0.1W	5% RES 0805 (TRS)	940-4710501	R412	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R336	SMD 470R	0.1W	5% RES 0805 (TRS)	940-4710501	R413	SMD 470R	0.1W	5% RES 0805 (TRS)	940-4710501
R337	SMD 560R	0.1W	5% RES 0805 (TRS)	940-5610501	R414	SMD 100R	0.1W	5% RES 0805 (TRS)	940-1010501
R339	SMD 180R	0.1W	5% RES 0805 (TRS)	940-1810501	R415	SMD 2K7	0.1W	5% RES 0805 (TRS)	940-2720501
R341	SMD 220R	0.1W	5% RES 0805 (TRS)	940-2210501	R416	SMD 910R	0.1W	5% RES 0805 (TRS)	940-9110501
R342	SMD 100R	0.1W	5% RES 0805 (TRS)	940-1010501	R417	SMD 270R	0.1W	5% RES 0805 (TRS)	940-2710501
R343	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501	R418	SMD 1K	0.1W	1% RES 0805 (TRS)	940-1020101
R344	SMD 1K8	0.1W	5% RES 0805 (TRS)	940-1820501	R419	SMD 270R	0.1W	1% RES 0805 TR	940-2710101
R345	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501	R420	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501
R346	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501	R421	SMD 750R	0.1W	1% RES 0805 TR	940-7510101
R347	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501	R422	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R348	SMD 4K7	0.1W	5% RES 0805 (TRS)	940-4720501	R423	SMD 270R	0.1W	5% RES 0805 (TRS)	940-2710501
R349	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501	R424	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501
R350	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501	R425	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501
R351	SMD 680R	0.1W	5% RES 0805 (TRS)	940-6810501	R426	SMD 270R	0.1W	5% RES 0805 (TRS)	940-2710501
R352	SMD 680R	0.1W	5% RES 0805 (TRS)	940-6810501	R427	SMD 270K	0.1W	5% RES 0805 (TRS)	940-2740501
R353	SMD 680R	0.1W	5% RES 0805 (TRS)	940-6810501	R428	SMD 470R	0.1W	5% RES 0805 (TRS)	940-4710501
R354	SMD 0.1W 5% ZEROHM LINK-0805 (TRS)		940-0000501		R429	SMD 4K7	0.1W	5% RES 0805 (TRS)	940-4720501
R355	SMD 470R	0.1W	5% RES 0805 (TRS)	940-4710501	R430	SMD 3K9	0.1W	5% RES 0805 (TRS)	940-3920501
R359	SMD 470R	0.1W	5% RES 0805 (TRS)	940-4710501	R431	SMD 12K	0.1W	5% RES 0805 (TRS)	940-1230501
R360	SMD 470R	0.1W	5% RES 0805 (TRS)	940-4710501	R432	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R361	SMD 390R	0.1W	5% RES 0805 (TRS)	940-3910501	R433	SMD 2K7	0.1W	5% RES 0805 (TRS)	940-2720501
R362	SMD 15K	0.1W	5% RES 0805 (TRS)	940-1530501	R434	SMD 100R	0.1W	5% RES 0805 (TRS)	940-1010501
R363	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501	R435	SMD 470R	0.1W	5% RES 0805 (TRS)	940-4710501
R364	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501	R436	SMD 470R	0.1W	5% RES 0805 (TRS)	940-4710501
R365	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501	R437	SMD 560R	0.1W	5% RES 0805 (TRS)	940-5610501
R366	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501	R439	SMD 180R	0.1W	5% RES 0805 (TRS)	940-1810501
R367	SMD 47K	0.1W	5% RES 0805 (TRS)	940-4730501	R441	SMD 220R	0.1W	5% RES 0805 (TRS)	940-2210501
R368	SMD 4K7	0.1W	5% RES 0805 (TRS)	940-4720501	R442	SMD 100R	0.1W	5% RES 0805 (TRS)	940-1010501
R369	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501	R443	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R370	SMD 56K	0.1W	5% RES 0805 (TRS)	940-5630501	R444	SMD 1K8	0.1W	5% RES 0805 (TRS)	940-1820501
R372	SMD 100K	0.1W	5% RES 0805 (TRS)	940-1040501	R445	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501
R373	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501	R446	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R374	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501	R447	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R375	SMD 47K	0.1W	5% RES 0805 (TRS)	940-4730501	R448	SMD 4K7	0.1W	5% RES 0805 (TRS)	940-4720501
R376	SMD 4M7	0.1W	5% RES 0805 (TRS)	940-4750501	R449	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R377	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501	R450	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501
R378	SMD 330K	0.1W	5% RES 0805 (TRS)	940-3340501	R451	SMD 680R	0.1W	5% RES 0805 (TRS)	940-6810501
R379	SMD 470K	0.1W	5% RES 0805 (TRS)	940-4740501	R452	SMD 680R	0.1W	5% RES 0805 (TRS)	940-6810501
R380	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501	R453	SMD 680R	0.1W	5% RES 0805 (TRS)	940-6810501
R381	SMD 4K7	0.1W	5% RES 0805 (TRS)	940-4720501	R454	SMD 0.1W 5% ZEROHM LINK-0805 (TRS)		940-0000501	
R382	SMD 390R	0.1W	5% RES 0805 (TRS)	940-3910501	R455	SMD 470R	0.1W	5% RES 0805 (TRS)	940-4710501
R384	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501	R458	SMD 4K7	0.1W	5% RES 0805 (TRS)	940-4720501
R385	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501	R459	SMD 470R	0.1W	5% RES 0805 (TRS)	940-4710501
R386	SMD 15K	0.1W	5% RES 0805 (TRS)	940-1530501	R460	SMD 470R	0.1W	5% RES 0805 (TRS)	940-4710501
R387	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501	R461	SMD 390R	0.1W	5% RES 0805 (TRS)	940-3910501
R388	SMD 4K7	0.1W	5% RES 0805 (TRS)	940-4720501	R462	SMD 15K	0.1W	5% RES 0805 (TRS)	940-1530501
R389	SMD 0.1W 5% ZEROHM LINK-0805 (TRS)		940-0000501		R463	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R390	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501	R464	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501

R465	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R466	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R467	SMD 47K	0.1W	5% RES 0805 (TRS)	940-4730501
R468	SMD 4K7	0.1W	5% RES 0805 (TRS)	940-4720501
R469	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R470	SMD 56K	0.1W	5% RES 0805 (TRS)	940-5630501
R472	SMD 100K	0.1W	5% RES 0805 (TRS)	940-1040501
R473	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501
R474	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R475	SMD 47K	0.1W	5% RES 0805 (TRS)	940-4730501
R476	SMD 4M7	0.1W	5% RES 0805 (TRS)	940-4750501
R477	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R478	SMD 330K	0.1W	5% RES 0805 (TRS)	940-3340501
R480	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501
R481	SMD 4K7	0.1W	5% RES 0805 (TRS)	940-4720501
R482	SMD 390R	0.1W	5% RES 0805 (TRS)	940-3910501
R484	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501
R485	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R486	SMD 15K	0.1W	5% RES 0805 (TRS)	940-1530501
R487	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501
R488	SMD 4K7	0.1W	5% RES 0805 (TRS)	940-4720501
R489	SMD 0.1W	5% ZEROHM LINK-0805 (TRS)	940-0000501	
R490	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R491	SMD 1K2	0.1W	5% RES 0805 (TRS)	940-1220501
R492	SMD 4K7	0.1W	5% RES 0805 (TRS)	940-4720501
R493	SMD 6K8	0.1W	5% RES 0805 (TRS)	940-6820501
R494	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501
R495	SMD 22K	0.1W	5% RES 0805 (TRS)	940-2230501
R497	SMD 1M	0.1W	5% RES 0805 (TRS)	940-1050501
R498	SMD 2K7	0.1W	1% RES 0805 (TRS)	940-2720101
R499	SMD 1K8	0.1W	1% RES 0805 (TRS)	940-1820101
R501	SMD 560R	0.1W	5% RES 0805 (TRS)	940-5610501
R502	SMD 560R	0.1W	5% RES 0805 (TRS)	940-5610501
R503	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R504	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501
R505	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501
R506	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R507	SMD 470R	0.1W	5% RES 0805 (TRS)	940-4710501
R508	SMD 4K7	0.1W	5% RES 0805 (TRS)	940-4720501
R509	SMD 560R	0.1W	5% RES 0805 (TRS)	940-5610501
R510	SMD 560R	0.1W	5% RES 0805 (TRS)	940-5610501
R511	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R512	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501
R513	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501
R514	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R515	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R516	SMD 100K	0.1W	5% RES 0805 (TRS)	940-1040501
R517	SMD 560R	0.1W	5% RES 0805 (TRS)	940-5610501
R518	SMD 560R	0.1W	5% RES 0805 (TRS)	940-5610501
R519	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R520	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501
R521	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501
R522	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R523	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R524	SMD 100K	0.1W	5% RES 0805 (TRS)	940-1040501
R525	SMD 560R	0.1W	5% RES 0805 (TRS)	940-5610501
R526	SMD 560R	0.1W	5% RES 0805 (TRS)	940-5610501
R527	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R528	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501
R529	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501
R530	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R531	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R532	SMD 100K	0.1W	5% RES 0805 (TRS)	940-1040501
R533	SMD 560R	0.1W	5% RES 0805 (TRS)	940-5610501
R534	SMD 560R	0.1W	5% RES 0805 (TRS)	940-5610501
R535	SMD 560R	0.1W	5% RES 0805 (TRS)	940-5610501
R536	SMD 560R	0.1W	5% RES 0805 (TRS)	940-5610501
R537	SMD 470K	0.1W	5% RES 0805 (TRS)	940-4740501
R538	68R	0.25W	5% CARBON FILM RES TR	140-6802501

## Integrated Circuits

U1	TEA2018 SWITCH MODE PSU (THOMSON)	109-0201801
U2	M50555 001P DISPLAY CONT (MISUBISHI)	109-0505551
U3	HEF4053 TRIPLE 2-CHANNEL MULTIPLEXER	106-0405301
U4	HEF 4052 DUAL 4-CHANNEL MULTIPLEXER	106-0405200
U5	TEA2130 SYNC SEP(DS173019) (THOMSON)	109-0213001
U6	24C16 16K EE (CATALYST)	104-0241601
U9	ULN2003 TRANSISTOR DARLINGTONS	100-0200300
U100	LM7001 FS CHIP (SANYO)	109-0700101
U101	HEF4053 TRIPLE 2-CHANNEL MULTIPLEXER	106-0405301
U102	CD4094BCN 8 BIT SHIFT AND STORE REGISTER	106-0409400
U103	TDA6160 SAT SOUND IF (SIEMENS)	909-0616001
U104	HEF4053 TRIPLE 2-CHANNEL MULTIPLEXER	106-0405301
U105	TL084 QUAD BI-FET OP AMP LOW NOISE	100-0008400
U106	129026 EXPANDER 28 DIL SKDIP	109-1290261
U200	LM7001 FS CHIP (SANYO)	109-0700101
U201	HEF4053 TRIPLE 2-CHANNEL MULTIPLEXER	106-0405301
U202	CD4094BCN 8 BIT SHIFT AND STORE REGISTER	106-0409400
U203	TDA6160 SAT SOUND IF (SIEMENS)	909-0616001
U204	HEF4053 TRIPLE 2-CHANNEL MULTIPLEXER	106-0405301
U300	LM7001 FS CHIP (SANYO)	109-0700101
U301	HEF4053 TRIPLE 2-CHANNEL MULTIPLEXER	106-0405301
U302	CD4094BCN 8 BIT SHIFT AND STORE REGISTER	106-0409400
U303	TDA6160 SAT SOUND IF (SIEMENS)	909-0616001
U304	HEF4053 TRIPLE 2-CHANNEL MULTIPLEXER	106-0405301
U305	TL084 QUAD BI-FET OP AMP LOW NOISE	100-0008400
U306	129026 EXPANDER 28 DIL SKDIP	109-1290261
U400	LM7001 FS CHIP (SANYO)	109-0700101
U401	HEF4053 TRIPLE 2-CHANNEL MULTIPLEXER	106-0405301
U402	CD4094BCN 8 BIT SHIFT AND STORE REGISTER	106-0409400
U403	TDA6160 SAT SOUND IF (SIEMENS)	909-0616001
U404	HEF4053 TRIPLE 2-CHANNEL MULTIPLEXER	106-0405301

## Miscellaneous Components

F/A SAMPLE	AXIAL INDUCTOR-47UH 5%TR	130-0470501
F/A SAMPLE	MOD WIRE-0.5 X 35MM RED	190-0503515
F/A SAMPLE	MOD WIRE-0.5 X 90MM RED	190-0509015
F/A SAMPLE	MOD WIRE - 0.5 X 120MM RED	190-0512015
F/A SAMPLE	MOD WIRE-0.5 X 150MM RED TELECIEL	190-0515015
F/A SAMPLE	MOD WIRE - 0.5 X 210MM RED	190-0521015
FIT TO D14	DIODE-BYW98-50TR	120-0009801
FIT TO R194SMD	47NF50V 10% CERX7R CAP 0805 (TRS)	950-4735621
FIT TO R294SMD	47NF50V 10% CERX7R CAP0805 (TRS)	950-4735621
FIT TO R394SMD	47NF50V 10% CERX7R CAP0805 (TRS)	950-4735621
FIT TO R494SMD	47NF50V 10% CERX7R CAP0805 (TRS)	950-4735621
F/TO C246 SMD	470NF 16V 20/80 CERY5V CAP0805 TRS	950-4741951
FR1	*A* FUSE F1AL 20 X 5MM GLASS FAST BLOWN	201-2521000
IS1	SONY INFRA-RED REC MODULE (SBX 1620-E2)	215-1620002
LED1	LED-GREEN 5MM H/EFFEL333GD	200-0110501
LED2	LED-GREEN 5MM H/EFFEL333GD	200-0110501
MOD100	BSFC77G01 2GHZ S/LNB 'F'TUNER SHARP 22CC	221-2077011
MOD200	BSFC77G01 2GHZ S/LNB 'F'TUNER SHARP 22CC	221-2077011
MOD300	BSFC77G01 2GHZ S/LNB 'F'TUNER SHARP 22CC	221-2077011
MOD400	BSFC77G01 2GHZ S/LNB 'F'TUNER SHARP 22CC	221-2077011
SW1	SWITCH-B3F3152 PCB SUBMIN 150GM (YELL)	204-0315211
T1	MAINS FILTER-(UF2327S-253-YOR5) "TDK"	232-2327000
T2	*A* TRANSFORMER-SM 800 SERIES MANBY	237-0400002
VR100	2K0.5W 10% S/TURN CERMET TRIMMERS	146-2025601
VR200	2K0.5W 10% S/TURN CERMET TRIMMERS	146-2025601
VR300	2K0.5W 10% S/TURN CERMET TRIMMERS	146-2025601
VR400	2K0.5W 10% S/TURN CERMET TRIMMERS	146-2025601
X1	XTAL 17.734MHZ HC49U 20/30/10 10PF PAR	170-0177341
X2	RESONATOR-503KHZ TYPE CSB503F21	171-0005030
X100	XTAL 5.625MHZ HC49U 50/50/10/ 30PF PAR	170-0056250
X101	FILTER-SFE 10.7MJA 10K-A(MURATA)	173-0107003
X102	FILTER-SFE 10.7MJA 10K-A(MURATA)	173-0107003
X103	FILTER-SFE 10.52MJA 10K-A(MURATA)	173-0105203
X104	FILTER-SFE 10.52MJA 10K-A(MURATA)	173-0105203



X105	FILTER-MA5A 10.7MHZ	173-0107051
X201	FILTER-SFE 10.7MJA 10K-A(MURATA)	173-0107003
X202	FILTER-SFE 10.7MJA 10K-A(MURATA)	173-0107003
X203	FILTER-SFE 10.52MJA 10K-A(MURATA)	173-0105203
X204	FILTER-SFE 10.52MJA 10K-A(MURATA)	173-0105203
X205	FILTER-MA5A 10.7MHZ	173-0107051
X300	XTAL 5.625MHZ HC49U 50/50/10/ 30PF PAR	170-0056250
X301	FILTER-SFE 10.7MJA 10K-A(MURATA)	173-0107003
X302	FILTER-SFE 10.7MJA 10K-A(MURATA)	173-0107003
X303	FILTER-SFE 10.52MJA 10K-A(MURATA)	173-0105203
X304	FILTER-SFE 10.52MJA 10K-A(MURATA)	173-0105203
X305	FILTER-MA5A 10.7MHZ	173-0107051
X401	FILTER-SFE 10.7MJA 10K-A(MURATA)	173-0107003
X402	FILTER-SFE 10.7MJA 10K-A(MURATA)	173-0107003
X403	FILTER-SFE 10.52MJA 10K-A(MURATA)	173-0105203
X404	FILTER-SFE 10.52MJA 10K-A(MURATA)	173-0105203
X405	FILTER-MA5A 10.7MHZ	173-0107051

### Common Mechanical Parts

1 OFF *A* MAINS CABLE-EURO "8" + PLUG	191-2015280
4 OFF PILLAR-TCBS-22.5 V/CRYPT STD/OFF (RICHCO)	248-1601001
7 OFF PILLAR-RLCBSRE-8-BLACK LOCKING (RICHCO)	248-0801001
2 OFF PLASTITE SCREW-4 X 1/4 POZI PAN BLACK	245-4140011
3 OFF SNAP RIVET-SR3555B BLACK PLASTIC RICHCO	247-3555111
1 OFF COVER-PSM8000 SMATV ISSUE 2	312-8000111
1 OFF CABLE CLAMP-NE3 4.8MM DIA.	206-0304800
1 OFF CABLE ASSY -5 WAY 150MM PSM8000 SMATV	266-8015050
1 OFF CABLE ASSY -7 WAY 180MM PSM8000 SMATV	266-8018070
1 OFF CABLE ASSY -5 WAY 190MM PSM8000 SMATV	266-8019050
1 OFF CABLE ASSY -4 WAY 210MM PSM8000 SMATV	266-8021040
1 OFF CABLE ASSY +PHONO PLUG 2W COAX RF O/P	266-8033020
4 OFF BUMPON-SJ5003 SMALL BLACK DOME	208-5003010
2 OFF FULL NUT-M3 PLATED	240-0030001
4 OFF HALF NUT-3/8 FORM 32 TO1.2A	240-1380011
4 OFF SELF-TAP SCREW-6 X 5/16 POZI PAN BLACK	244-6560011
12OFF SCREW M3x8 P/P TAP.C/W WASHER BLK SEAL	246-3080011
2 OFF M3 SHAKEPROOF WASHER	241-0031001
1 OFF HANDSET - PSM8000 SMATV UNBRANDED SMK	699-8000000
2 OFF BATTERY AA	239-0015010

### ELECTRICAL PARTS FOR OTP (Z8) BOARD

C3	100NF 50V 5MM M/LAYER CER.CAP TR	157-1045751
C4	100NF 50V 5MM M/LAYER CER.CAP TR	157-1045751
C5	33PF 16V 5MM CERAMIC CAP 10% TR	150-3301651
C6	39PF 16V 5MM CERAMIC CAP 10% TR	150-3901651
FIT TO U4		
SOCKET-28 PIN IC DIL		209-2002800
FIT TO X1		
INS.WASHER-FOR HC18/49 (HOLED) XTAL CAN		208-0153000
PL 1	PIN HDR-20 WAY EXTENDED S/ROW(HARWIN)	161-1002001
REV A1	PCB-OTP SMATV SERIES REV A1	182-0222101
U1	SMD IC-Z86C9620VSC ROMLESS Z8	904-0869601
U3	74HC374	102-1037400
U4	EPROM-27256 PACE SMATV (805-8000001)	805-8000001
X1	CRYSTAL-4MHZ HC18U 50/50/-10/+60 30PF PAR	170-0040000

### ELECTRICAL PARTS FOR MODULATOR BOARD (EMC VERSION)

#### Capacitors

C1	SMD 10PF 50V 5% CER CAP 0805 (TRS)	950-1005501
C3	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C5	SMD 27PF 50V 5% CER COG CAP 0805 (TRS)	950-2705501
C6	SMD 220NF 50V 20/80% CER Y5V CAP 0805 TR	950-2245951
C7	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C8	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C9	1UF 16V 5MM RADIAL ELECT' CAP TR	155-1051751
C10	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C11	SMD 22NF 50V 10% CER.CAP 0805	950-2235601
C12	SMD 220NF 50V 20/80% CER Y5V CAP 0805 TR	950-2245951
C13	SMD 150PF 50V 5% CER COG CAP 0805 (TRS)	950-1515501
C14	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C15	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C16	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C17	SMD 5.6PF 50V +-0.25PF CER COG CAP 0805	950-0565301
C18	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C19	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C20	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C21	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C23	SMD 22NF 50V 10% CER.CAP 0805	950-2235601
C24	SMD 22NF 50V 10% CER.CAP 0805	950-2235601
C26	SMD 3.0PF 50V +-0.25PF CER COG CAP 0805	950-0305301
C27	SMD 220PF 50V 5% CER COG CAP 0805 (TRS)	950-2215501
C28	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C29	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C30	SMD 1.5PF 50V +-0.25PF CER COG CAP 0805	950-0155301
C31	SMD 1.5PF 50V +-0.25PF CER COG CAP 0805	950-0155301
C32	SMD 1.5PF 50V +-0.25PF CER COG CAP 0805	950-0155301
C33	SMD 1.5PF 50V +-0.25PF CER COG CAP 0805	950-0155301
C34	SMD 12PF 50V 5% CER COG CAP 0805 (TRS)	950-1205501
C35	SMD 100PF 50V 5% CER COG CAP 0805 (TRS)	950-1015501
C36	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C37	SMD 10PF 50V 5% CER CAP 0805 (TRS)	950-1005501
C39	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C41	SMD 27PF 50V 5% CER COG CAP 0805 (TRS)	950-2705501
C42	SMD 220NF 50V 20/80% CER Y5V CAP 0805 TR	950-2245951
C43	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C44	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C45	1UF 16V 5MM RADIAL ELECT' CAP TR	155-1051751
C46	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C47	SMD 22NF 50V 10% CER.CAP 0805	950-2235601
C48	SMD 220NF 50V 20/80% CER Y5V CAP 0805 TR	950-2245951
C49	SMD 150PF 50V 5% CER COG CAP 0805 (TRS)	950-1515501
C50	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C51	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C52	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C53	SMD 3.0PF 50V +-0.25PF CER COG CAP 0805	950-0305301
C54	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C55	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C56	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C57	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C59	SMD 22NF 50V 10% CER.CAP 0805	950-2235601
C60	SMD 22NF 50V 10% CER.CAP 0805	950-2235601
C61	SMD 5.6PF 50V +-0.25PF CER COG CAP 0805	950-0565301
C62	SMD 3.0PF 50V +-0.25PF CER COG CAP 0805	950-0305301
C65	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C66	SMD 1.5PF 50V +-0.25PF CER COG CAP 0805	950-0155301
C67	SMD 1.5PF 50V +-0.25PF CER COG CAP 0805	950-0155301
C68	SMD 1.5PF 50V +-0.25PF CER COG CAP 0805	950-0155301
C69	SMD 1.5PF 50V +-0.25PF CER COG CAP 0805	950-0155301
C70	SMD 12PF 50V 5% CER COG CAP 0805 (TRS)	950-1205501
C71	SMD 100PF 50V 5% CER COG CAP 0805 (TRS)	950-1015501
C72	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C73	SMD 10PF 50V 5% CER CAP 0805 (TRS)	950-1005501

C75	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501	C161	SMD 220PF 50V 5% CER COG CAP 0805 (TRS)	950-2215501
C77	SMD 27PF 50V 5% CER COG CAP 0805 (TRS)	950-2705501	C162	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C78	SMD 220NF 50V 20/80% CER Y5V CAP 0805 TR	950-2245951	C165	SMD 1.8PF 50V +0.25PF CER COG CAP 0805	950-0185301
C79	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C168	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C80	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C169	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C81	1UF 16V 5MM RADIAL ELECT' CAP TR	155-1051751	C170	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C82	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C171	SMD 5.6PF 50V +0.25PF CER COG CAP 0805	950-0565301
C83	SMD 22NF 50V 10% CER.CAP 0805	950-2235601	C172	100UF 16V 5MM RADIAL ELECT' CAP TR	155-1071751
C84	SMD 220NF 50V 20/80% CER Y5V CAP 0805 TR	950-2245951	C173	100UF 16V 5MM RADIAL ELECT' CAP TR	155-1071751
C85	SMD 150PF 50V 5% CER COG CAP 0805 (TRS)	950-1515501	C174	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951
C86	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C175	1UF 50V 5MM M/LAYER CER.CAP TR	157-1055751
C87	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C176	1UF 50V 5MM M/LAYER CER.CAP TR	157-1055751
C88	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C177	1UF 50V 5MM M/LAYER CER.CAP TR	157-1055751
C90	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C178	1UF 50V 5MM M/LAYER CER.CAP TR	157-1055751
C91	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C181	SMD 4.7PF 50V +0.25PF CER COG CAP 0805	950-0475301
C92	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951	C182	SMD 5.6PF 50V +0.25PF CER COG CAP 0805	950-0565301
C93	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C184	SMD 1.8PF 50V +0.25PF CER COG CAP 0805	950-0185301
C95	SMD 22NF 50V 10% CER.CAP 0805	950-2235601	C185	SMD 3.0PF 50V +0.25PF CER COG CAP 0805	950-0305301
C96	SMD 22NF 50V 10% CER.CAP 0805	950-2235601	C189	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C97	SMD 3.0PF 50V +0.25PF CER COG CAP 0805	950-0305301	C190	10UF 16V 5MM RADIAL ELECT' CAP TR	155-1061751
C98	SMD 3.0PF 50V +0.25PF CER COG CAP 0805	950-0305301	C191	1000UF 16V 5MM RAD ELEC' CAP (10X16)	155-1081750
C101	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C192	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C102	SMD 1.5PF 50V +0.25PF CER COG CAP 0805	950-0155301	C193	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C103	SMD 1.5PF 50V +0.25PF CER COG CAP 0805	950-0155301	C194	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C104	SMD 1.5PF 50V +0.25PF CER COG CAP 0805	950-0155301	C195	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C105	SMD 1.5PF 50V +0.25PF CER COG CAP 0805	950-0155301	C196	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C106	SMD 12PF 50V 5% CER COG CAP 0805 (TRS)	950-1205501	C197	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C107	SMD 100PF 50V 5% CER COG CAP 0805 (TRS)	950-1015501	C198	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C108	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C199	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C109	SMD 10PF 50V 5% CER CAP 0805 (TRS)	950-1005501	C200	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C111	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501	C201	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C113	SMD 27PF 50V 5% CER COG CAP 0805 (TRS)	950-2705501	C202	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C114	SMD 220NF 50V 20/80% CER Y5V CAP 0805 TR	950-2245951	C203	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C115	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C204	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C116	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C205	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C117	1UF 16V 5MM RADIAL ELECT' CAP TR	155-1051751	C206	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C118	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C207	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C119	SMD 22NF 50V 10% CER.CAP 0805	950-2235601	C208	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C120	SMD 220NF 50V 20/80% CER Y5V CAP 0805 TR	950-2245951	C209	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C121	SMD 150PF 50V 5% CER COG CAP 0805 (TRS)	950-1515501	C210	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C122	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C211	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C123	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C212	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C124	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C213	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C125	SMD 3.0PF 50V +0.25PF CER COG CAP 0805	950-0305301	C214	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C126	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C215	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C127	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C216	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C128	SMD 0.1UF 25V 20/80% CER Y5V CAP 0805 TR	950-1042951	C217	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C129	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C218	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C131	SMD 22NF 50V 10% CER.CAP 0805	950-2235601	C219	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C132	SMD 22NF 50V 10% CER.CAP 0805	950-2235601	C220	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C133	SMD 5.6PF 50V +0.25PF CER COG CAP 0805	950-0565301	C221	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C134	SMD 3.0PF 50V +0.25PF CER COG CAP 0805	950-0305301	C222	SMD 27PF 50V 5% CER COG CAP 0805 (TRS)	950-2705501
C137	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C223	SMD 27PF 50V 5% CER COG CAP 0805 (TRS)	950-2705501
C138	SMD 1.5PF 50V +0.25PF CER COG CAP 0805	950-0155301	C224	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C139	SMD 1.5PF 50V +0.25PF CER COG CAP 0805	950-0155301	C225	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C140	SMD 1.5PF 50V +0.25PF CER COG CAP 0805	950-0155301	C226	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C141	SMD 1.5PF 50V +0.25PF CER COG CAP 0805	950-0155301	C227	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C142	SMD 12PF 50V 5% CER COG CAP 0805 (TRS)	950-1205501	C228	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C143	SMD 100PF 50V 5% CER COG CAP 0805 (TRS)	950-1015501	C229	SMD 56PF 50V 5% CER COG CAP 0805 (TRS)	950-5605501
C144	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C230	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C145	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C231	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C147	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C232	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C148	SMD 5.6PF 50V +0.25PF CER COG CAP 0805	950-0565301	C233	SMD 12PF 50V 5% CER COG CAP 0805 (TRS)	950-1205501
C151	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C234	SMD 12PF 50V 5% CER COG CAP 0805 (TRS)	950-1205501
C155	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C235	SMD 3.3PF 50V +0.25PF CER COG CAP 0805	950-0335301
C157	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C236	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C158	SMD 220PF 50V 5% CER COG CAP 0805 (TRS)	950-2215501	C237	SMD 12PF 50V 5% CER COG CAP 0805 (TRS)	950-1205501
C159	SMD 220PF 50V 5% CER COG CAP 0805 (TRS)	950-2215501	C238	SMD 12PF 50V 5% CER COG CAP 0805 (TRS)	950-1205501
C160	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501	C239	SMD 3.3PF 50V +0.25PF CER COG CAP 0805	950-0335301



C240	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C241	SMD 12PF 50V 5% CER COG CAP 0805 (TRS)	950-1205501
C242	SMD 12PF 50V 5% CER COG CAP 0805 (TRS)	950-1205501
C243	SMD 3.3PF 50V +0.25PF CER COG CAP 0805	950-0335301
C244	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C245	SMD 12PF 50V 5% CER COG CAP 0805 (TRS)	950-1205501
C246	SMD 12PF 50V 5% CER COG CAP 0805 (TRS)	950-1205501
C247	SMD 3.3PF 50V +0.25PF CER COG CAP 0805	950-0335301
C248	SMD 1NF 50V 5% CER COG CAP 0805 (TRS)	950-1025501
C250	SMD 27PF 50V 5% CER COG CAP 0805 (TRS)	950-2705501
C251	SMD 4.7PF 50V +0.25PF CER COG CAP 0805	950-0475301
C252	SMD 8.2PF 50V +0.5PF CER COG CAP 0805	950-0825401
C253	SMD 6.8PF 50V +0.25PF CER COG CAP 0805	950-0685301
C254	SMD 12PF 50V 5% CER COG CAP 0805 (TRS)	950-1205501
C255	SMD 10PF 50V 5% CER CAP 0805 (TRS)	950-1005501

## Diodes

D1	SMD DIODE-BB619 MINI PLAST (TRS))	912-0061901
D3	SMD DIODE-BB515 MINI PLAST (TRS)	912-0051501
D4	SMD DIODE-BB619 MINI PLAST (TRS))	912-0061901
D6	SMD DIODE-BB515 MINI PLAST (TRS)	912-0051501
D7	SMD DIODE-BB619 MINI PLAST (TRS))	912-0061901
D9	SMD DIODE-BB515 MINI PLAST (TRS)	912-0051501
D10	SMD DIODE-BB619 MINI PLAST (TRS))	912-0061901
D12	SMD DIODE-BB515 MINI PLAST (TRS)	912-0051501
D13	5V6 5% 400MW ZENER DIODE TR	125-0056501
D14	SMD DIODE-BB515 MINI PLAST (TRS)	912-0051501
D15	SMD DIODE-BB515 MINI PLAST (TRS)	912-0051501
D16	SMD DIODE-BB515 MINI PLAST (TRS)	912-0051501
D17	SMD DIODE-BB515 MINI PLAST (TRS)	912-0051501
D18	SMD DIODE-BB515 MINI PLAST (TRS)	912-0051501
D19	SMD DIODE-BB515 MINI PLAST (TRS)	912-0051501
D20	SMD DIODE-BB515 MINI PLAST (TRS)	912-0051501
D21	SMD DIODE-BB515 MINI PLAST (TRS)	912-0051501

## Inductors

L1	AXIAL INDUCTOR-27UH 5% TR	130-0270501
L2	AXIAL INDUCTOR-47UH 5% TR	130-0470501
L3	SOUND COIL 4.7UH +3% SUMIDA HKS-999-035	133-0047051
L7	BALUN-BC0403RID-B (PEDOKA)	133-0040300
L8	18NH-COIL (GOLD) AIR WOUND (PEDOKA)	134-0018080
L9	15NH-COIL(GREEN) AIR WOUND (PEDOKA)	134-0015090
L10	AXIAL INDUCTOR-27UH 5% TR	130-0270501
L11	AXIAL INDUCTOR-47UH 5% TR	130-0470501
L12	SOUND COIL 4.7UH +3% SUMIDA HKS-999-035	133-0047051
L17	18NH-COIL (GOLD) AIR WOUND (PEDOKA)	134-0018080
L18	15NH-COIL(GREEN) AIR WOUND (PEDOKA)	134-0015090
L19	AXIAL INDUCTOR-27UH 5%TR	130-0270501
L20	AXIAL INDUCTOR-47UH 5%TR	130-0470501
L21	SOUND COIL 4.7UH +3% SUMIDA HKS-999-035	133-0047051
L26	18NH-COIL (GOLD) AIR WOUND (PEDOKA)	134-0018080
L27	15NH-COIL(GREEN) AIR WOUND (PEDOKA)	134-0015090
L28	AXIAL INDUCTOR-27UH 5%TR	130-0270501
L29	AXIAL INDUCTOR-47UH 5%TR	130-0470501
L30	SOUND COIL 4.7UH +3% SUMIDA HKS-999-035	133-0047051
L35	18NH-COIL (GOLD) AIR WOUND (PEDOKA)	134-0018080
L36	15NH-COIL(GREEN) AIR WOUND (PEDOKA)	134-0015090
L38	BALUN-BC0403RID-B (PEDOKA)	133-0040300
L39	BALUN-BC0403RID-B (PEDOKA)	133-0040300

## Connectors

PL1	5W SHROUDED HEADER	B 5B-EH-A JST	161-1020510
PL2	5W SHROUDED HEADER	B 5B-EH-A JST	161-1020510
PL3	7W SHROUDED HEADER	B 7B-EH-A JST	161-1020710
PL4	4W SHROUDED HEADER	B 4B-EH-A JST	161-1020410

## Transistors

Q1	SMD TRANSISTOR-BC846B	SOT-23	911-1084651
Q2	TRANSISTOR-BC547B NPN TO-92 PACKAGE	TR 110-1054701	
Q3	SMD TRANSISTOR-BFR193 (SIEMENS)	SOT-23	911-0019351
Q4	SMD TRANSISTOR-BC846B	SOT-23	911-1084651
Q5	TRANSISTOR-BC547B NPN TO-92 PACKAGE	TR 110-1054701	
Q6	SMD TRANSISTOR-BFR193 (SIEMENS)	SOT-23	911-0019351
Q7	SMD TRANSISTOR-BC846B	SOT-23	911-1084651
Q8	TRANSISTOR-BC547B NPN TO-92 PACKAGE	TR 110-1054701	
Q9	SMD TRANSISTOR-BFR193 (SIEMENS)	SOT-23	911-0019351
Q10	SMD TRANSISTOR-BC846B	SOT-23	911-1084651
Q11	TRANSISTOR-BC547B NPN TO-92 PACKAGE	TR 110-1054701	
Q12	SMD TRANSISTOR-BFR193 (SIEMENS)	SOT-23	911-0019351
Q13	SMD TRANSISTOR-BFQ193 (SIEMENS)	SOT-89	911-0019341
Q15	SMD TRANSISTOR-BFQ193 (SIEMENS)	SOT-89	911-0019341
Q16	TRANSISTOR-BC557 PNP TO-92 PACKAGE	TR 110-0055701	
Q17	TRANSISTOR-BC557 PNP TO-92 PACKAGE	TR 110-0055701	
Q18	TRANSISTOR-BC557 PNP TO-92 PACKAGE	TR 110-0055701	
Q19	TRANSISTOR-BC557 PNP TO-92 PACKAGE	TR 110-0055701	
Q20	TRANSISTOR-BC557 PNP TO-92 PACKAGE	TR 110-0055701	
Q21	TRANSISTOR-BC557 PNP TO-92 PACKAGE	TR 110-0055701	

## Resistors

R1	SMD 750R 0.1W 5% RES 0805 TR	940-7510501
R2	SMD 8K2 0.1W 5% RES 0805 (TRS)	940-8220501
R4	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501
R5	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501
R8	SMD 56R 0.1W 5% RES 0805 (TRS)	940-5600501
R9	SMD 2K7 0.1W 5% RES 0805 (TRS)	940-2720501
R10	SMD 0.1W 5% ZEROHM LINK-0805 (TRS)	940-0000501
R12	SMD 12K 0.1W 5% RES 0805 (TRS)	940-1230501
R13	SMD 56R 0.1W 5% RES 0805 (TRS)	940-5600501
R16	SMD 4K7 0.1W 5% RES 0805 (TRS)	940-4720501
R17	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501
R21	SMD 22K 0.1W 5% RES 0805 (TRS)	940-2230501
R22	SMD 22K 0.1W 5% RES 0805 (TRS)	940-2230501
R31	SMD 22K 0.1W 5% RES 0805 (TRS)	940-2230501
R32	SMD 750R 0.1W 5% RES 0805 TR	940-7510501
R33	SMD 8K2 0.1W 5% RES 0805 (TRS)	940-8220501
R35	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501
R36	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501
R39	SMD 56R 0.1W 5% RES 0805 (TRS)	940-5600501
R40	SMD 2K7 0.1W 5% RES 0805 (TRS)	940-2720501
R43	SMD 12K 0.1W 5% RES 0805 (TRS)	940-1230501
R44	SMD 56R 0.1W 5% RES 0805 (TRS)	940-5600501
R47	SMD 4K7 0.1W 5% RES 0805 (TRS)	940-4720501
R48	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501
R50	SMD 1K2 0.1W 5% RES 0805 (TRS)	940-1220501
R51	SMD 1K8 0.1W 5% RES 0805 (TRS)	940-1820501
R52	SMD 22K 0.1W 5% RES 0805 (TRS)	940-2230501
R53	SMD 22K 0.1W 5% RES 0805 (TRS)	940-2230501
R60	SMD 8K2 0.1W 5% RES 0805 (TRS)	940-8220501
R61	SMD 1K8 0.1W 5% RES 0805 (TRS)	940-1820501
R62	SMD 22K 0.1W 5% RES 0805 (TRS)	940-2230501
R63	SMD 750R 0.1W 5% RES 0805 TR	940-7510501
R64	SMD 8K2 0.1W 5% RES 0805 (TRS)	940-8220501
R65	SMD 1K2 0.1W 5% RES 0805 (TRS)	940-1220501
R66	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501
R67	SMD 10K 0.1W 5% RES-0805 (TRS)	940-1030501
R68	SMD 8K2 0.1W 5% RES 0805 (TRS)	940-8220501
R70	SMD 56R 0.1W 5% RES 0805 (TRS)	940-5600501
R71	SMD 2K7 0.1W 5% RES 0805 (TRS)	940-2720501
R73	SMD 15K 0.1W 5% RES 0805 (TRS)	940-1530501
R74	SMD 12K 0.1W 5% RES 0805 (TRS)	940-1230501
R75	SMD 56R 0.1W 5% RES 0805 (TRS)	940-5600501
R78	SMD 4K7 0.1W 5% RES 0805 (TRS)	940-4720501
R83	SMD 22K 0.1W 5% RES 0805 (TRS)	940-2230501
R84	SMD 22K 0.1W 5% RES 0805 (TRS)	940-2230501

R93	SMD 22K	0.1W	5% RES 0805 (TRS)	940-2230501
R94	SMD 750R	0.1W	5% RES 0805 TR	940-7510501
R95	SMD 8K2	0.1W	5% RES 0805 (TRS)	940-8220501
R97	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R98	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R101	SMD 56R	0.1W	5% RES 0805 (TRS)	940-5600501
R102	SMD 2K7	0.1W	5% RES 0805 (TRS)	940-2720501
R104	SMD 0.1W	5% ZEROHM LINK-0805 (TRS)	940-0000501	
R105	SMD 12K	0.1W	5% RES 0805 (TRS)	940-1230501
R106	SMD 56R	0.1W	5% RES 0805 (TRS)	940-5600501
R109	SMD 4K7	0.1W	5% RES 0805 (TRS)	940-4720501
R114	SMD 22K	0.1W	5% RES 0805 (TRS)	940-2230501
R115	SMD 22K	0.1W	5% RES 0805 (TRS)	940-2230501
R124	SMD 22K	0.1W	5% RES 0805 (TRS)	940-2230501
R130	SMD 75R	0.1W	5% RES 0805 (TRS)	940-7500501
R132	SMD 47R	0.1W	5% RES 0805 (TRS)	940-4700501
R136	SMD 75R	0.1W	5% RES 0805 (TRS)	940-7500501
R140	SMD 75R	0.1W	5% RES 0805 (TRS)	940-7500501
R141	SMD 75R	0.1W	5% RES 0805 (TRS)	940-7500501
R142	220R	0.25W	5% CARBON FILM RES TR	140-2212501
R143	220R	0.25W	5% CARBON FILM RES TR	140-2212501
R144	SMD 100K	0.1W	5% RES 0805 (TRS)	940-1040501
R145	SMD 100K	0.1W	5% RES 0805 (TRS)	940-1040501
R146	SMD 100K	0.1W	5% RES 0805 (TRS)	940-1040501
R147	SMD 100K	0.1W	5% RES 0805 (TRS)	940-1040501
R148	SMD 680R	0.1W	5% RES 0805 (TRS)	940-6810501
R149	SMD 47R	0.1W	5% RES 0805 (TRS)	940-4700501
R150	SMD 680R	0.1W	5% RES 0805 (TRS)	940-6810501
R151	SMD 300R	0.1W	5% RES 0805 (TRS)	940-3010501
R152	SMD 300R	0.1W	5% RES 0805 (TRS)	940-3010501
R153	SMD 300R	0.1W	5% RES 0805 (TRS)	940-3010501
R154	SMD 300R	0.1W	5% RES 0805 (TRS)	940-3010501
R155	SMD 100R	0.1W	5% RES 0805 (TRS)	940-1010501
R158	SMD 680R	0.1W	5% RES 0805 (TRS)	940-6810501
R159	SMD 47R	0.1W	5% RES 0805 (TRS)	940-4700501
R160	SMD 680R	0.1W	5% RES 0805 (TRS)	940-6810501
R167	SMD 680R	0.1W	5% RES 0805 (TRS)	940-6810501
R168	SMD 47R	0.1W	5% RES 0805 (TRS)	940-4700501
R169	SMD 680R	0.1W	5% RES 0805 (TRS)	940-6810501
R173	SMD 680R	0.1W	5% RES 0805 (TRS)	940-6810501
R174	SMD 47R	0.1W	5% RES 0805 (TRS)	940-4700501
R175	SMD 680R	0.1W	5% RES 0805 (TRS)	940-6810501
R179	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R182	SMD 270R	0.1W	5% RES 0805 (TRS)	940-2710501
R190	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R200	SMD 47R	0.1W	5% RES 0805 (TRS)	940-4700501
R201	SMD 47R	0.1W	5% RES 0805 (TRS)	940-4700501
R202	SMD 47R	0.1W	5% RES 0805 (TRS)	940-4700501
R204	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501
R205	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501
R206	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501
R207	SMD 1K	0.1W	5% RES 0805 (TRS)	940-1020501
R208	SMD 470R	0.1W	5% RES 0805 (TRS)	940-4710501
R209	SMD 27R	0.1W	5% RES 0805 (TRS)	940-2700501
R210	SMD 470R	0.1W	5% RES 0805 (TRS)	940-4710501
R211	SMD 470R	0.1W	5% RES 0805 (TRS)	940-4710501
R212	SMD 470R	0.1W	5% RES 0805 (TRS)	940-4710501
R213	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R214	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R215	SMD 470R	0.1W	5% RES 0805 (TRS)	940-4710501
R216	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R217	SMD 470R	0.1W	5% RES 0805 (TRS)	940-4710501
R218	SMD 10K	0.1W	5% RES-0805 (TRS)	940-1030501
R219	SMD 100R	0.1W	5% RES 0805 (TRS)	940-1010501
R220	SMD 100R	0.1W	5% RES 0805 (TRS)	940-1010501
R221	SMD 100R	0.1W	5% RES 0805 (TRS)	940-1010501
R222	SMD 100R	0.1W	5% RES 0805 (TRS)	940-1010501
R223	SMD 100R	0.1W	5% RES 0805 (TRS)	940-1010501
R224	SMD 100R	0.1W	5% RES 0805 (TRS)	940-1010501

R225	SMD 100R	0.1W	5% RES 0805 (TRS)	940-1010501
R226	SMD 100R	0.1W	5% RES 0805 (TRS)	940-1010501
R227	SMD 100R	0.1W	5% RES 0805 (TRS)	940-1010501
R228	SMD 100R	0.1W	5% RES 0805 (TRS)	940-1010501
R229	SMD 100R	0.1W	5% RES 0805 (TRS)	940-1010501
R230	SMD 100R	0.1W	5% RES 0805 (TRS)	940-1010501
R231	SMD 22K	0.1W	5% RES 0805 (TRS)	940-2230501
R232	SMD 22K	0.1W	5% RES 0805 (TRS)	940-2230501
R233	SMD 22K	0.1W	5% RES 0805 (TRS)	940-2230501
R234	SMD 22K	0.1W	5% RES 0805 (TRS)	940-2230501
R235	SMD 22K	0.1W	5% RES 0805 (TRS)	940-2230501
R236	SMD 22K	0.1W	5% RES 0805 (TRS)	940-2230501
R237	SMD 22K	0.1W	5% RES 0805 (TRS)	940-2230501
R238	SMD 22K	0.1W	5% RES 0805 (TRS)	940-2230501
R239	SMD 22K	0.1W	5% RES 0805 (TRS)	940-2230501
R240	SMD 22K	0.1W	5% RES 0805 (TRS)	940-2230501
R241	SMD 22K	0.1W	5% RES 0805 (TRS)	940-2230501
R242	SMD 22K	0.1W	5% RES 0805 (TRS)	940-2230501

## Integrated Circuits

U1	SL5066 VIDEO MODULATOR (PLESSEY)	109-0506601
U2	SP5511S I2C BUS 4 ADDRESS FREQ SYNTH	909-0551101
U3	SL5066 VIDEO MODULATOR (PLESSEY)	109-0506601
U4	SP5511S I2C BUS 4 ADDRESS FREQ SYNTH	909-0551101
U5	SL5066 VIDEO MODULATOR (PLESSEY)	109-0506601
U6	SP5511S I2C BUS 4 ADDRESS FREQ SYNTH	909-0551101
U7	SL5066 VIDEO MODULATOR (PLESSEY)	109-0506601
U8	SP5511S I2C BUS 4 ADDRESS FREQ SYNTH	909-0551101

## Miscellaneous Components

CAN1	MOD SCRNN CAN FRAME FOR PSM8000 SMATV	315-8000000
CAN2	MOD SCRNN CAN FRAME FOR PSM8000 SMATV	315-8000000
CAN3	MOD SCRNN CAN FRAME FOR PSM8000 SMATV	315-8000000
CAN4	MOD SCRNN CAN FRAME FOR PSM8000 SMATV	315-8000000
F/A	SAMPLE 47K 0.25W 5% CARBON FILM RES TR	140-4732501
J1	PHONO SOCKET-SINGLE PCB MTG FOR SMATV	165-8000101
REV A3		PCB-SMATV
MODULATOR BOARD (EMC) - REV A3		182-0202103

# GRID REFERENCES - MOTHERBOARD CIRCUIT DIAGRAM 1

CAPACITORS		C59	B2	C148	C5	C226	B6	D6	D2	L204 <sup>AA</sup>	A6	Q106	D4	R26	C2	R85	A1
C1	D2	C60	C2	C149	C5	C227	B6	D7	D2	L205	B5	Q107	D4	R27	C2	R86	A1
C2	D2	C61 <sup>**</sup>	B2	C150	C5	C228	B6	D8	D2	L206	A5	Q108	D4	R28	C2	R87	A1
C3	D2	C62 <sup>**</sup>	B2	C151	C5	C230°	B6	D9	D2	L207	A5	Q109	D4	R29	C1	R88	B1
C4	D2	C63	A2	C152 <sup>**</sup>	C5	C231	B6	D10	D1	L208	A5	Q110	D4	R30	C1	R89	B1
C5	D2	C64 <sup>‡</sup>	A2	C153	C5	C232 <sup>**</sup>	A6	D11	D2	L300	D5	Q111	D4	R31	C1	R90	B1
C6	D2	C65 <sup>‡</sup>	A2	C154	C5	C233	A6	D12	D2	L301	D5	Q112	D6	R32	C1	R91	B1
C7	D2	C66	A2	C155	C5	C234	A6	D13	D2	L302 <sup>AA</sup>	C6	Q113	D6	R33	C1	R92	B1
C8	D2	C67	A1	C156	C5	C235	A6	D14	D2	L303 <sup>**</sup>	C6	Q114	D5	R34	C1	R93	B1
C9	D1	C68	B1	C157	D4	C236	A6	D15	D3	L304 <sup>AA</sup>	C6	Q115	D5	R35	D2	R94	C1
C10	D2	C69 <sup>**</sup>	D3	C158 <sup>**</sup>	C4	C237	A6	D16	D3	L305	C5	Q116	D6	R36	D2	R95	C1
C11	D2	C70	C1	C159	C4	C238 <sup>**</sup>	A6	D17	D3	L306	C5	Q118	C3	R37	D1	R100	D6
C12	D2	C101	D6	C160	C4	C239	A6	D18	D3	L307	C5	Q119	D6	R38	C1	R101	D6
C13	D2	C102	D6	C161	C5	C240	A6	D19	C2	L308	C5	Q200	B6	R39	D2	R102	D6
C14	D2	C103	D6	C162	C5	C241	A5	D20	C2	L400	B5	Q201	B5	R40	D2	R103	D6
C15	D3	C104	D6	C163	C4	C242	A5	D21	C1	L401	B5	Q202	B5	R41	D2	R104	D6
C16	D2	C105	D6	C164	C4	C243 <sup>**</sup>	B5	D22 <sup>**</sup>	B2	L402 <sup>AA</sup>	A6	Q203	B5	R42	D2	R105	D6
C17	D2	C106	D6	C165	C4	C244 <sup>**</sup>	A5	D23 <sup>**</sup>	B2	L403 <sup>**</sup>	C6	Q204	B5	R43	C2	R106	D6
C18	D2	C107	D6	C166	C4	C245 <sup>**</sup>	A5	D24 <sup>**</sup>	A2	L404 <sup>AA</sup>	A6	Q205	B4	R44	C2	R107	D6
C19 <sup>**</sup>	D3	C108	D6	C167	C4	C246	A5	D25	C2	L405	B5	Q206	B4	R45 <sup>**</sup>	C2	R108	D6
C20 <sup>**</sup>	D3	C109	D5	C168	C4	C247	A5	D100	D6	L406	A5	Q207	B4	R46	D2	R109	D5
C21 <sup>**</sup>	D3	C110	D5	C169 <sup>**</sup>	C4	C248	A5	D101	D6	L407	A5	Q208	B4	R47	D2	R110	D5
C22	D2	C111	D5	C170	C4	C250	A5	D102	D6	L408	A5	Q209	B4	R48	C2	R111	D5
C23	D2	C112	D5	C171	C4	C251	A5	D103	C5			Q210	B4	R49	C2	R112	D5
C24	D2	C113	D5	C172	C4	C252 <sup>**</sup>	B5	D104	C3	WIRE LINKS		Q211	B3	R50	C2	R113	D5
C25	D3	C114 <sup>**</sup>	D5	C173	C4	C253	A5	D105	C3	LK17 <sup>^</sup>	D3	Q212	B6	R51	C2	R114	D5
C26 <sup>**</sup>	D3	C115	D5	C174	C4	C255	B5	D106	C6	LK23 <sup>^</sup>	D3	Q213	B6	R52	C3	R115	D5
C27 <sup>**</sup>	D3	C116 <sup>**</sup>	D5	C175	C3	C256	B5	D107	C6			Q214	B5	R53	C3	R116	D5
C28	C2	C117	D5	C176 <sup>**</sup>	C3	C257 <sup>**</sup>	B6	D108	C6	CONNECTORS		Q215	B5	R54	C3	R117	D5
C29	C2	C118	D4	C177	C6	C258 <sup>**</sup>	B4	D200	B6	PL1	A1	Q216	B6	R55	C3	R118	D5
C30	C2	C119	D4	C178	C6	C259	A4	D201	B6	PL2	D3	Q218	A3	R56	B3	R119	D5
C31	C2	C120	D4	C179 <sup>**</sup>	C6	C261	A5	D202	B6	PL3	B1	Q219	B6	R57	B2	R120	D5
C32	C2	C121	D4	C180	D6	C262	A5	D203	A5	PL5	D3			R58	B2	R121	D5
C33	C2	C122	D4	C181	D5	C263	A4	D204	A4	PL6 <sup>**</sup>	A3	RESISTORS		R59	B2	R122	D4
C34	C2	C123	D4	C182 <sup>**</sup>	D5	C265	A4	D205	A5	PL9 <sup>**</sup>	C3	R1	D1	R60	B2	R123	D4
C35	C2	C124	D4	C184	D6	C266	B4	D206	A6	PL11 <sup>**</sup>	B3	R2	D2	R61	C2	R124	D4
C36	C1	C125	D4	C201	B6	C267	A4	D207	A6	PL12 <sup>**</sup>	D3	R3	D2	R62	B2	R125	D4
C37	C1	C126	D6	C202	B6	C268	A4	D208	A6	PL100	C5	R4	D2	R63	C1	R126	D4
C38	C1	C127	D6	C203	B6	C269 <sup>**</sup>	A4			PL200	A5	R5	D2	R64	C1	R127	D4
C39	C1	C128	D5	C204	B6	C270	A4	INDUCTANCES		SK1	D1	R6	D2	R65	C1	R128	D4
C40	C2	C129	D4	C205	B6	C271	A4	L1	D2	SK2	C2	R7	D2	R66 <sup>**</sup>	B2	R129	D4
C41	C2	C130°	C6	C206	B6	C273	A4	L2	D2	SK100	D6	R8	D2	R67	B3	R130	D4
C42	C2	C131	C6	C209	B5	C274	A4	L3	D3	SK200	B6	R9	D2	R68	B3	R131	D4
C43	C2	C132 <sup>**</sup>	C6	C210	B5	C275	B3	L4	C2			R10	D2	R69	B2	R132	D4
C44	C2	C133	C6	C211	B5	C276 <sup>**</sup>	A3	L5	B3	TRANSISTORS		R11	D2	R70	B2	R133	D4
C45	C2	C134	C6	C212	B5	C277	A6	L6	D3	Q1	D2	R12	D2	R71	B2	R134	D4
C46	C2	C135	C6	C213	B5	C278	A6	L100	D5	Q2	C1	R13	D2	R72	B2	R135	D4
C47	C2	C136	C6	C214 <sup>**</sup>	B5	C279	A6	L101	D5	Q3	C2	R14	D2	R73	B2	R136	D4
C48	C3	C137	C6	C215	B5	C280	B6	L102 <sup>AA</sup>	C6	Q4	B2	R15	D2	R74	B2	R137	D4
C49	C3	C138 <sup>**</sup>	C6	C216 <sup>**</sup>	B5	C281	B5	L103 <sup>**</sup>	C6	Q5	C1	R16	D2	R75	B2	R138 <sup>**</sup>	D3
C50	C2	C139	C6	C217	B4	C282 <sup>**</sup>	B5	L104 <sup>AA</sup>	C6	Q6	A2	R17	D2	R76	B2	R139	D6
C51	C2	C140	C6	C218	B4	C284	B4	L105	D5	Q7	A2	R18	D2	R77	B2	R140 <sup>**</sup>	D6
C52	C3	C141	C5	C219	B4			L106	C5	Q8	B1	R19	D2	R78 <sup>**</sup>	B2	R141	D6
C53	C3	C142	C5	C220	B4	DIODES		L107	C5	Q100	D6	R20	D1	R79	A2	R142	D6
C54	C3	C143 <sup>**</sup>	D5	C221	B4	D1	D2	L108	C5	Q101	D5	R21	D3	R80	A2	R143	D5
C55	C3	C144 <sup>**</sup>	C5	C222	B4	D2	D2	L200	B5	Q102	D5	R22#	D3	R81	A2	R144	D6
C56	C3	C145 <sup>**</sup>	C5	C223	B4	D3	D2	L201	B5	Q103	D5	R23	C2	R82	A2	R145	D5
C57	B2	C146	C5	C224	B4	D4	D2	L202 <sup>AA</sup>	A6	Q104	D5	R24	C2	R83	A1	R146	D5
C58	B2	C147	C5	C225	B4	D5	D2	L203 <sup>**</sup>	A6	Q105	D4	R25	C2	R84	A1	R147	D5

R148	D5	R207	B6	R268	A5	U4	C2
R149	D5	R208	B6	R269	A5	U5	C2
R150	D6	R209	B5	R270	B5	U6	B2
R151	D6	R210	B5	R271**	A3	U7**	B2
R152	D6	R211	B5	R272	B5	U8**	A2
R153	C6	R212	B5	R273	A5	U9	A2
R154	C6	R213	B5	R274	A5	U100	D6
R155	C6	R214	B5	R275	A5	U101A	D5
R156**	D6	R215	B5	R276	A5	U101B	D5
R157**	D6	R216	B5	R277	A4	U101C	D4
R158	C6	R217	B5	R278	A4	U102	D5
R159	D6	R218	B5	R280	A4	U103	D6
R160	C6	R219	B5	R281	A4	U104	C4
R161	C6	R220	B5	R282	A4	U105A	A5
R162	C6	R221	B5	R283**	A4	U105B	C4
R163	C5	R222	B4	R284	A4	U105C	A4
R164	D5	R223	B4	R285	A4	U105D	C5
R165	C5	R224	B4	R286	A4	U106A	C5
R166	C5	R225	B4	R287	B4	U106B	A5
R167	C5	R226	B4	R288	B4	U200	B6
R168	C5	R227	B4	R289	B4	U201A	B5
R169	C5	R228	B4	R290	B4	U201B	B5
R170	D5	R229	B4	R291	A4	U201C	B4
R171**	C5	R230	B4	R292	A4	U202	B5
R172	C5	R231	B4	R293	A3	U203	B6
R173	C5	R232	B4	R294	A3	U204A	A4
R174	C5	R233	B4	R295	A3	U204B	A4
R175	C5	R234	B4	R296**	A3	U204C	B4
R176	C5	R235	B4	R297	A4		
R177	C4	R236	B4	R298	B5	<b>MISCELLANEOUS COMPONENTS</b>	
R178	C4	R237	B3	R299	B5		
R179	C4	R238**	B3	R501	C6	BAT1**	B2
R180	C4	R239	B6	R502	C6	FS1	D1
R181	C4	R241	B6	R503	C6	IR1	B1
R182	C4	R242	B6	R504	C6	LED1	A1
R183**	C4	R243	B5	R505	C6	LED2	B1
R184	C4	R244	B6	R506	C6	MOD100	D6
R185	C4	R245	B5	R507	C6	MOD200	B6
R186	C4	R246	B5	R508	C6	SW1	B1
R187	C4	R247	B5	R509	A6	T1	D2
R188	C4	R248	B5	R510	A6	T2	D2
R189	C4	R249	B5	R511	A6	VR100	D6
R190	C4	R250	B6	R512	A6	VR200	B6
R191	C4	R251	B6	R513	A6	X1	C2
R192	C3	R252	B6	R514	A6	X2	B3
R193	C3	R253	A6	R515	A6	X3**	B2
R194	C3	R254	A6	R516	A6	X4†	A2
R195	C3	R255	A6	R533	A4	X100	D6
R196**	C3	R256**	B6	R534	B4	X101	D6
R197	C4	R257**	B6	R537	C3	X102	D6
R198	D5	R259	B6	R538	D3	X103	C6
R199	D5	R260	A6			X104	C6
R200	B6	R261	A6	<b>INTEGRATED CIRCUITS</b>		X105	C6
R201	B6	R262	A6			X201	B6
R202	B6	R263	A5	U1	D2	X202	B6
R203	B6	R264	B5	U2	C2	X203	B6
R204	B6	R265	B5	U3A	C1	X204	B6
R205	B6	R266	A5	U3B	C1	X205	A6
R206	B6	R267	A5	U3C	C2		

\*\* not fitted

# actually a wire link (in a resistor position)

° actually a resistor (in a capacitor position)

^ actually an inductance (in a link position)

^^ actually a wire link (in an inductance position)

† mounted on copper side of PCB

‡ may be mounted on U8 extension PCB  
(NB: C64 as C5 and C65 as C6, X4 as X1)

## GRID REFERENCES - MOTHERBOARD CIRCUIT DIAGRAM 2

CAPACITORS																INTEGRATED CIRCUITS			
C301	D6	C359	C4	C438 **	A6	D407	A6	Q405	B4	R343	D5	R402	B6	R461	A5	U300	D6		
C302	D6	C360	C4	C439	A5	D408	A6	Q406	B4	R344	D5	R403	B6	R462	A6	U301A	D5		
C303	D6	C361	C5	C440	A6			Q407	B4	R345	D5	R404	B6	R463	A5	U301B	D5		
C304	D6	C362	C5	C441	A5	INDUCTANCES				R346	D5	R405	B6	R464	B5	U301C	D4		
C305	D6	C363	C4	C442	A5	L300	D5	Q408	B4	R347	D5	R406	B6	R465	B5	U302	D5		
C306	D6	C364	C4	C443 **	B5	L301	D5	Q409	B4	R348	D5	R407	B6	R466	A5	U303	C6		
C307	D6	C365	C4	C444 **	A5	L302	C6	Q410	B4	R349	D5	R408	B6	R467	A5	U304	C4		
C308	D5	C366	C4	C445 **	A5	L302	C6	Q411	B3	R350	D6	R409	B5	R468	A5	U305A	A5		
C309	D5	C367	C4	C446	A5	L303**	C6	Q412	B6	R351	D6	R410	B5	R469	A5	U305B	C4		
C310	D5	C368	C4	C447	A5	L305	C5	Q413	B6	R352	D6	R411	B5	R470	B5	U305C	A4		
C311	D5	C369 **	C4	C448	A5	L306	C5	Q414	B5	R353	B6	R412	B5	R471**	A5	U305D	C5		
C312	D5	C370	C4	C449	A5	L307	C5	Q415	B5	R354	C6	R413	B5	R472	B5	U306A	C5		
C313	D5	C371	C4	C451	A5	L308	C5	Q416	B6	R355	B6	R414	B5	R473	A5	U306B	A5		
C314**	D5	C372	D4	C452**	A5	L400	B5	Q418	A3	R356**	D6	R415	B5	R474	A3	U400	B6		
C315	D5	C373	C4	C453	A5	L401	B5	Q419	B6	R357**	C6	R416	B5	R475	A3	U401A	B5		
C316**	D5	C374	C4	C455	B5	L402	A6	RESISTORS				R358**	C6	R417	B5	U401B	B5		
C317	D4	C375	C3	C456	B5	L403**	A6	R300	D6	R359	C5	R418	B5	R476	A5	U402	B6		
C318	D4	C376**	C3	C458**	B4	L404	A6	R301	D6	R360	C5	R419	B5	R477	A4	U403	B6		
C319	D4	C377	C6	C459	A4	L405	B5	R302	D6	R361	C5	R420	B5	R478	A4	U404	A4		
C320	D4	C378	C6	C461	A5	L406	A5	R303	D6	R362	C6	R421	B5	R480	B4				
C321	D4	C379	C6	C462	A5	L407	A5	R304	D6	R363	C5	R422	B4	R481	A4				
C322	D4	C380	D6	C463	A4	L408	A5	R305	D6	R364	D5	R423	B4	R482	A4				
C323	D4	C381	D5	C465	A4			R306	D6	R365	C5	R424	B4	R483**	A4				
C324	D4	C382**	D5	C466	B4	CONNECTORS				R366	C5	R425	B4	R484	A4				
C325	D4	C384	D6	C467	A4	PL4	D3	R307	D6	R367	C5	R426	B4	R485	A4				
C326	D6	C401	B6	C468	A4	PL7**	C3	R308	D6	R368	C5	R427	B4	R486	A4				
C327	D6	C402	B6	C469 **	A4	PL8**	A3	R309	D5	R369	C5	R428	B4	R487	B4				
C328	D5	C403	B6	C470	A4	PL10**	A3	R310	D5	R370	D5	R429	B4	R488	B4				
C329	D4	C404	B6	C471	A4	PL13**	D3	R311	D5	R371**	C5	R430	B4	R489	B4				
C330°	C6	C405	B6	C473	A4	PL300	C5	R312	D5	R372	C5	R431	B4	R490	B4				
C331	C6	C406	B6	C474	A4	PL400	A5	R313	D5	R373	C5	R432	B4	R491	A4				
C332**	C6	C409	B5	C475	B3	SK300	D6	R314	D5	R374	C5	R433	B4	R492	A3				
C333	C6	C410	B5	C476**	A3	SK400	B6	R315	D5	R375	C5	R434	B4	R493	B2				
C334	C6	C411	B5	C477	A6			R316	D5	R376	C5	R435	B4	R494	A3				
C335	C6	C412	B5	C478	A6	TRANSISTORS				R377	C4	R436	B4	R495	A3				
C336	C6	C413	B5	C479	A6	Q300	D6	R317	D5	R378	C4	R437	B3	R496**	A3				
C337	C6	C414**	B5	C480	B6	Q301	D5	R318	D5	R379	C4	R438**	B3	R497	A4				
C338 **	C6	C415	B5	C481	B5	Q302	D5	R319	D5	R380	C4	R439	B6	R498	B5				
C339	C6	C416**	B5	C482**	B5	Q303	D5	R320	D5	R381	C4	R440**	B6	R499	B5				
C340	C6	C417	B4	C483	B5	Q304	D5	R321	D5	R382	C4	R441	B6	R500	C6				
C341	C5	C418	B4	C484	B6	Q305	D4	R322	D4	R383**	C4	R442	B6	R501	C6				
C342	C5	C419	B4			Q306	D4	R323	D4	R384	C4	R443	B5	R502	C6				
C343 **	C5	C420	B4	DIODES				R324	D4	R385	C4	R444	B5	R503	C6				
C344 **	C5	C421	B4	D300**	D6	Q307	D4	R325	D4	R386	C4	R445	B5	R504	C6				
C345 **	C5	C422	B4	D301	D6	Q308	D4	R326	D4	R387	C4	R446	B5	R505	C6				
C346	C5	C423	B4	D302	D6	Q309	D4	R327	D4	R388	D4	R447	B5	R506	C6				
C347	C5	C424	B4	D303	C5	Q310	D4	R328	D4	R389	C4	R448	B5	R507	A6				
C348	C5	C425	B4	D304	C3	Q311	D3	R329	D4	R390	C3	R449	B5	R508	A6				
C349	C5	C426	B6	D305	C3	Q312	D6	R330	D4	R391	C3	R450	B6	R509	A6				
C350	C5	C427	B6	D306	C6	Q313	D6	R331	D4	R392	C3	R451	B6	R510	A6				
C351	C5	C428	B5	D307	C6	Q314	D5	R332	D4	R393	C3	R452	B6	R511	A6				
C352 **	C5	C430°	A6	D308	C6	Q315	D5	R333	D4	R394	C3	R453	A6	R512	A6				
C353	C5	C431	A6	D400**	B6	Q316	D6	R334	D4	R395	C3	R454	A6	R513	A6				
C354	D5	C432 **	A6	D401	B6	Q318	B3	R335	D4	R396**	C3	R455	B6	R514	A6				
C355	C5	C433	A6	D402	B6	Q319	D6	R336	D4	R397	C4	R456**	B6	R515	D4				
C356	C5	C434	A6	D403	A5	Q400	B6	R337	D3	R398	D5	R457**	B6	R516	B4				
C357	D4	C435	A6	D404	A4	Q401	B5	R338**	D3	R399	D5	R458	A6						
C358 **	C4	C436	A6	D405	A3	Q402	B5	R339	D6	R400	B6	R459	B5						
		C437	A6	D406	A6	Q403	B5	R340**	D6	R401	B6	R460	A5						
						Q404	B5	R342	D6										

\*\* not fitted

# actually a wire link (in a resistor position)

° actually a resistor (in a capacitor position)

^ actually an inductance (in a link position)

^^ actually a wire link (in an inductance position)

† mounted on copper side of PCB

‡ may be mounted on U8 extension PCB (NB: C64 as C5 and C65 as C6, X4 as X1)

# GRID REFERENCES - MOTHERBOARD PCB

CAPACITORS		C59	C1	C148†	B3	C226	D4	C308†	E2	C367†	F2	C446†	G3	D25	F1	L205	E2
C1	A4	C60†	C4	C149†	B3	C227†	D1	C309	E3	C368†	F2	C447†	G3	D100	B4	L206	E2
C2	A3	C61**	C1	C150†	C2	C228	D4	C310	E3	C369**	F2	C448†	G3	D101	C4	L207	D2
C3	B3	C62†**	C4	C151	C2	C230†	D2	C311	E3	C370†	F3	C449†	G3	D102	B4	L208	D2
C4†	A2	C63†	E4	C152†**	D3	C231 †	E3	C312†	F2	C371	F2	C451	H2	D103†	B3	L300	F3
C5	A3	C64†**	E4	C153	C3	C232†**	D3	C313†	F2	C372	F2	C452†**	G3	D104	B3	L301	F3
C6	A3	C65†**	E4	C154†	D3	C233 †	D3	C314†**	F2	C373	F2	C453	G2	D105	B3	L302^^	E3
C7	B3	C66	E1	C155†	D2	C234	D3	C315†	F2	C374	F2	C455†	F2	D106	C4	L303**	E3
C8	B3	C67	E1	C156†	D2	C235†	E2	C316†**	F2	C375†	F3	C456†	F2	D107	C4	L304^^	E2
C9	B3	C68†	B1	C157	D3	C236†	E3	C317†	F2	C376**	F1	C458†**	G2	D108	E1	L305	F2
C10†	B4	C69†**	B4	C158†**	D2	C237†	D3	C318†	F1	C377	F3	C459†	G2	D200	D4	L306	F2
C11	B1	C70†	F4	C159†	C2	C238†**	D3	C319	F4	C378	F4	C461	F3	D201	D4	L307	F2
C12†	A4	C101†	B1	C160	D3	C239	E2	C320†	F1	C379†	D4	C462†	F2	D202	D4	L308	E2
C13†	A4	C102†	B1	C161	D3	C240†	E3	C321†	F2	C380†	E1	C463†	F2	D203†	D3	L400	H3
C14	A1	C103	C4	C162†	D2	C241†	D3	C322†	F1	C381†	F2	C465	G2	D204	D2	L401	H3
C15	C1	C104	B3	C163†	D2	C242†	D3	C323†	F1	C382†**	F2	C466†	G3	D205	D2	L402^^	G3
C16†	B4	C105†	B2	C164	D3	C243†**	E3	C324†	F1	C384†	F1	C467†	G2	D206	D4	L403**	G2
C17†	B4	C106†	B2	C165	C3	C244†**	E3	C325	F4	C401†	F1	C468†	G2	D207	D4	L404^^	G2
C18	B1	C107†	C2	C166†	D3	C245†**	D3	C326	F3	C402†	F1	C469†**	G2	D208	E1	L405	H2
C19**	B1	C108†	B2	C167†	C2	C246†	D3	C327†	E1	C403	F4	C470†	F3	D300**	E4	L406	G2
C20†**	B4	C109	B3	C168†	C2	C247†	D3	C328	F4	C404	G3	C471	F2	D301	F4	L407	G2
C21**	B1	C110	C3	C169†**	C2	C248†	D3	C329	F3	C405†	G2	C473	G2	D302	E4	L408	G2
C22†	B4	C111	C3	C170†	D3	C250†	D3	C330†	E2	C406†	G2	C474	G2	D303†	E3		
C23†	B4	C112†	C2	C171	D2	C251	E2	C331†	F3	C409	F3	C475†	F3	D304	F2		
C24	B1	C113†	C2	C172	C2	C252†**	D3	C332†**	E2	C410	G4	C476**	F1	D305	F2		
C25	B1	C114†**	C2	C173	C2	C253	D3	C333†	E3	C411	G3	C477	H4	D306	F4		
C26†**	B4	C115†	C2	C174	C2	C255†	C2	C334	E3	C412†	H2	C478	H4	D307	F4		
C27†**	B4	C116†**	C2	C175†	C3	C256†	C2	C335†	F3	C413†	H2	C479†	D4	D308	D1		
C28†	G4	C117†	C2	C176**	F1	C257†**	D3	C336†	F3	C414†**	H2	C480†	G1	D400**	F4		
C29	G1	C118†	C1	C177	C3	C258†**	D2	C337†	E3	C415†	H2	C481†	G2	D401	G4		
C30	G1	C119	C4	C178	C4	C259†	D2	C338†**	C3	C416†**	H2	C482†**	G2	D402	G4		
C31†	G4	C120†	C1	C179†**	E4	C261	D3	C339	F2	C417†	H2	C483	G3	D403†	G3		
C32†	G4	C121†	C2	C180†	B1	C262†	D2	C340†	F3	C418†	H1	C484†	G1	D404	G2		
C33†	G4	C122†	C1	C181†	C2	C263†	D2	C341†	E3	C419	H4			D405	G2		
C34†	G4	C123†	C1	C182†**	C2	C265	D2	C342†	E3	C420†	H2			D406	G4		
C35†	G4	C124†	C1	C184†	C1	C266†	D3	C343†**	F3	C421†	H2			D407	G4		
C36†	G4	C125	C4	C201†	D1	C267†	D2	C344†**	F3	C422†	G1			D408	D1		
C37	G1	C126	C3	C202†	D1	C268†	E2	C345†**	F3	C423†	G1						
C38	G1	C127†	B1	C203	D4	C269†**	D2	C346†	E3	C424†	G1						
C39†	G4	C128	C3	C204	D3	C270†	C3	C347†	E3	C425	H4						
C40	F1	C129	C3	C205†	D2	C271	C2	C348†	E3	C426	G4						
C41	F1	C130†	B2	C206†	D2	C273	D2	C349†	E3	C427†	G1						
C42	F1	C131†	C3	C209	D3	C274	D2	C350†	F3	C428†	G4						
C43	G1	C132†**	B2	C210	D4	C275†	D3	C351	F2	C430†	G2						
C44†	H4	C133†	C3	C211	D3	C276**	F1	C352†**	F3	C431†	H3						
C45†	H4	C134	C3	C212†	E2	C277	E4	C353	F3	C432†**	G3						
C46	H1	C135†	C3	C213†	E2	C278	E4	C354†	G3	C433†	G3						
C47†	H4	C136†	C3	C214†**	E2	C279†	E4	C355†	G2	C434	G3						
C48†	H4	C137†	C3	C215†	E2	C280†	D1	C356†	G2	C435†	G2						
C49†	H4	C138†**	C3	C216†**	E2	C281†	D2	C357	G2	C436†	G3						
C50†	H4	C139	C2	C217†	E2	C282†**	D2	C358†**	F2	C437†	G3						
C51†	H4	C140†	C3	C218†	E1	C284†	D1	C359†	F2	C438†	G3						
C52	H1	C141†	C3	C219	E4	C301†	E1	C360	G3	C439	H2						
C53†	H4	C142†	B3	C220†	E2	C302†	E1	C361	G3	C440†	G3						
C54†	H4	C143†**	C3	C221†	E2	C303	E4	C362†	G2	C441†	G3						
C55†	H4	C144†**	C3	C222†	E1	C304	E3	C363†	G2	C442†	G3						
C56	H1	C145†**	C3	C223†	E2	C305†	E2	C364	G3	C443†**	H3						
C57†	H4	C146†	C3	C224†	E1	C306†	E2	C365	F3	C444†**	G3						
C58†	H4	C147†	B3	C225	E4	C307†	E2	C366†	F3	C445†**	G3						

## WIRE LINKS

LK1	B1
LK2	B1
LK3	B2
LK4	C1
LK5	C1
LK6	C1
LK7	C1
LK8	C1
LK9	C1
LK10	C2
LK11	B2
LK12	B2
LK13	B2
LK14	B2
LK15	B2
LK16	B2
LK17^	B2
LK18	B2
LK19	B4
LK20	B4
LK21	B4
LK22	B4
LK23^	B4
LK24	C3
LK26	C3
LK27	B3
LK28	B3
LK29	B3
LK30	B4
LK31	B4
LK32	B4
LK33	B4
LK34	B4
LK35	C4
LK36	C4

## DIODES

D1	A2
D2	A2
D3	A2
D4	A2
D5	B2
D6	B2
D7	B3
D8	B3
D9	B3
D10	A3
D11	A1
D12	A1
D13	F1
D14	F1
D15	F1
D16	F1
D17	F1
D18	F1
D19	F1
D20	G1
D21	F1
D22**	C1
D23**	C1
D24**	E1

## INDUCTANCES

L1	A4
L2	B1
L3	B1
L4	G1
L5	H1
L6	B2
L100	C3
L101	C3
L102^^	B3
L103**	B3
L104^^	B2
L105	C3
L106	C3
L107	C3
L108	B2
L200	E3
L201	E3
L202^^	D3
L203**	D2
L204^^	D2

LK37	C4	LK96	D2	LK155	G2	LK214	E3	LK273	G3	Q109	C4	Q411	G3	R50†	H4	R113†	C2
LK38	D4	LK97	D2	LK156	G2	LK215	E3	LK274	G3	Q110	C3	Q412	G4	R51†	H4	R114†	C2
LK39	D3	LK98	D2	LK157	G2	LK216	E3	LK275	G3	Q111	C3	Q413	G4	R52†	H4	R115†	C2
LK40	C3	LK99	D2	LK158	G2	LK217	E3	LK276	G3	Q112	C4	Q414	H3	R53†	H4	R116†	C2
LK41	C3	LK100	E1	LK159	G2	LK218	E3	LK277	H3	Q113	C4	Q415	H2	R54†	H4	R117†	C2
LK42	C3	LK101	E2	LK160	G2	LK219	E3	LK278	G4	Q114	B3	Q416	G4	R55†	H4	R118†	C2
LK43	C3	LK102	E1	LK161	G2	LK220	E2	LK279	G4	Q115	C2	Q418	F2	R56†	H4	R119†	C2
LK44	C3	LK103	E1	LK162	G2	LK221	E2	LK280	G4	Q116	C4	Q419	G2	R57†	H4	R120†	C2
LK45	C3	LK104	E1	LK163	G2	LK222	E2	LK281	G4	Q118	C2			R58†	H4	R121†	C2
LK46	C3	LK105	E1	LK164	G2	LK223	E2	LK282	C3	Q119	C2	<b>RESISTORS</b>		R59†	H4	R122†	C2
LK47	C3	LK106	E1	LK165	G2	LK224	E2	LK283	D3	Q200	D3	R1	A4	R60†	H4	R123†	C2
LK48	D3	LK107	E1	LK166	G1	LK225	E2	LK284	F3	Q201	D4	R2	A3	R61†	H4	R124†	C1
LK49	C3	LK108	E2	LK167	G2	LK226	E3	LK285	G3	Q202	D3	R3	B2	R62†	H4	R125†	C2
LK50	C2	LK109	E2	LK168	G2	LK227	E3	LK286	E3	Q203	D3	R4	A2	R63†	F4	R126†	C1
LK51	C2	LK110	E2	LK169	G1	LK228	E3	LK287	B3	Q204	D3	R5†	B2	R64†	F4	R127†	C1
LK52	C2	LK111	E2	LK170	G2	LK229	E3			Q205	D3	R6	A3	R65†	F4	R128†	C2
LK53	C2	LK112	E2	LK171	G1	LK230	E3	<b>CONNECTORS</b>		Q206	D4	R7†	B2	R66†**	C4	R129†	C1
LK54	C2	LK113	E1	LK172	G1	LK231	E3	PL1	B4	Q207	D4	R8†	B2	R67†	C4	R130†	C1
LK55	D2	LK114	E2	LK173	G1	LK232	E3	PL2	C1	Q208	D3	R9	B3	R68†	C4	R131†	C1
LK56	D2	LK115	E2	LK174	G2	LK233	E3	PL3	D1	Q209	D4	R10†	B2	R69†	C4	R132†	C2
LK57	D2	LK116	E2	LK175	G2	LK234	E3	PL4	F2	Q210	D3	R11†	B2	R70†	C4	R133†	C2
LK58	D2	LK117	E2	LK176	H2	LK235	E3	PL5	C2	Q211	D3	R12†	A2	R71†	C4	R134†	C2
LK59	D2	LK118	E2	LK177	H2	LK236	F3	PL6**	F1	Q212	D4	R13	A3	R72†	C4	R135†	C2
LK60	D2	LK119	E2	LK178	H2	LK237	F3	PL7**	F1	Q213	D4	R14	B3	R73†	C4	R136†	C2
LK61	D2	LK120	E2	LK179	H2	LK238	F3	PL8**	F1	Q214	E3	R15	B3	R74†	F4	R137†	C2
LK62	D2	LK121	E2	LK180	H2	LK239	F3	PL9**	F1	Q215	E2	R16†	B2	R75†	E4	R138†**	F4
LK63	D2	LK122	E2	LK181	H2	LK240	F3	PL10**	F1	Q216	D4	R17	B2	R76†	D4	R139†	B1
LK64	D2	LK123	E2	LK182	H2	LK241	F3	PL11**	F1	Q218	D2	R18	B3	R77†	E4	R140†**	C1
LK65	D2	LK124	E2	LK183	H2	LK242	F2	PL12**	F1	Q219	D2	R19	B3	R78†**	C4	R141†	C1
LK66	D2	LK125	E2	LK184	H2	LK243	F2	PL13**	F1	Q300	E3	R20	B2	R79†	E4	R142†	C1
LK67	D2	K126	E2	LK185	H3	LK244	F2	PL100	C3	Q301	E4	R21†	A4	R80†	E4	R143†	C1
LK68	D2	LK127	E1	LK186	H3	LK245	F2	PL200	E2	Q302	F3	R22#	B1	R81†	E4	R144†	C1
LK69	C2	LK128	E2	LK187	H3	LK246	F2	PL300	F2	Q303	F3	R23†	G4	R82†	E4	R145†	B1
LK70	C2	LK129	E2	LK188	H3	LK247	F3	PL400	H2	Q304	F3	R24†	G4	R83†	E3	R146†	B2
LK71	C2	LK130	E2	LK189	D2	LK248	F3	SK1	A4	Q305	F3	R25†	G4	R84†	D3	R147†	B2
LK72	C2	LK131	E1	LK190	D2	LK249	F3	SK2	H4	Q306	F4	R26†	G4	R85†	D4	R148†	C3
LK73	C2	LK132	E2	LK191	D2	LK250	F3	SK100	C4	Q307	F4	R27†	G4	R86†	D4	R149†	C3
LK74	D2	LK133	F2	LK192	D3	LK251	F3	SK200	E4	Q308	F3	R28†	G4	R87†	B1	R150†	B1
LK75	D2	LK134	F2	LK193	D3	LK252	F3	SK300	F4	Q309	F4	R29†	G4	R88†	C4	R151†	B1
LK76	D1	LK135	F1	LK194	D3	LK253	F3	SK400	H4	Q310	F3	R30†	G4	R89†	E4	R152†	C3
LK77	D1	LK136	F1	LK195	D3	LK254	F3			Q311	F3	R31†	G4	R90†	E4	R153†	C3
LK78	D1	LK137	F1	LK196	D3	LK255	F3	<b>TRANSISTORS</b>		Q312	E4	R32†	G4	R91†	E4	R154†	C3
LK79	D1	LK138	F1	LK197	D3	LK256	F4	Q1	B4	Q313	F4	R33†	G4	R92†	C1	R155†	C3
LK80	D1	LK139	F2	LK198	D3	LK257	F4	Q2	G1	Q314	E3	R34†	G4	R93†	C1	R156†**	C2
LK81	D1	LK140	F2	LK199	D3	LK258	F4	Q3	F1	Q315	F2	R35†	F4	R94†	G4	R157†**	C3
LK82	D1	LK141	F2	LK200	D3	LK259	F4	Q4	H1	Q316	E4	R36†	F4	R95†	G4	R158†	B3
LK83	D1	LK142	F2	LK201	D3	LK260	F3	Q5	F1	Q318	F2	R37†	F4	R100†	B1	R159†	C3
LK84	D1	LK143	F2	LK202	D3	LK261	G2	Q6	E1	Q319	F2	R38†	F4	R101†	B2	R160†	C3
LK85	D1	LK144	F2	LK203	E3	LK262	G2	Q7	E1	Q400	G3	R39†	F4	R102†	B2	R161†	C3
LK86	D1	LK145	F2	LK204	E3	LK263	G3	Q8	E1	Q401	G4	R40†	F4	R103†	B2	R162†	C3
LK87	D1	LK146	F2	LK205	E3	LK264	G3	Q100	B3	Q402	G3	R41†	F4	R104†	B2	R163†	C3
LK88	D1	LK147	F2	LK206	E3	LK265	G3	Q101	B4	Q403	G3	R42†	F4	R105†	B2	R164†	C3
LK89	D1	LK148	G1	LK207	E3	LK266	G3	Q102	C3	Q404	G3	R43†	F4	R106†	C1	R165†	C3
LK90	D1	LK149	G1	LK208	D4	LK267	G3	Q103	C3	Q405	H3	R44†	F4	R107†	C1	R166†	C3
LK91	D1	LK150	G1	LK209	D4	LK268	G3	Q104	C3	Q406	H4	R45†**	F4	R108†	B1	R167†	B3
LK92	D2	LK151	G1	LK210	D4	LK269	G3	Q105	C3	Q407	G4	R46†	G4	R109†	C2	R168†	C3
LK93	D2	LK152	G1	LK211	E4	LK270	G3	Q106	C4	Q408	G3	R47†	G4	R110†	B1	R169†	D3
LK94	D2	LK153	G1	LK212	E4	LK271	G3	Q107	C4	Q409	G4	R48†	H4	R111†	C2	R170†	C3
LK95	D2	LK154	G1	LK213	E4	LK272	G3	Q108	C3	Q410	G3	R49†	H4	R112†	C2	R171†**	C3

R172†	D2	R231†	E1	R291†	D3	R350†	E1	R409†	G2	R468†	G3	R529†	H1
R173†	C3	R232†	D2	R292†	D3	R351†	E1	R410†	G1	R469†	G3	R530†	H1
R174†	C2	R233†	D2	R293†	D3	R352†	E3	R411†	G2	R470†	G3	R531†	D4
R175†	D2	R234†	D2	R294†	D3	R353†	E3	R412†	G2	R471†**	G3	R532†	D4
R176†	D2	R235†	D2	R295†	D3	R354†	F3	R413†	G2	R472†	G2	R533†	C2
R177†	D2	R236†	D2	R296†	F4	R355†	F3	R414†	G2	R473†	G3	R534†	D2
R178†	D2	R237†	D2	R297†	D2	R356†**	F2	R415†	G1	R474†	G3	R535†	F2
R179†	D2	R238†**	F4	R298†	D2	R357†**	F3	R416†	G2	R475†	F2	R536†	G2
R180†	D2	R239†	D1	R299†	D2	R358†**	E3	R417†	G2	R476†	F2	R537†	H4
R181†	C2	R240†**	D1	R300†	E2	R359†	F3	R418†	G2	R477†	F2	R538†	B1
R182†	C2	R241†	D1	R301†	E2	R360†	F3	R419†	G2	R478†	F2	<b>INTEGRATED CIRCUITS</b>	
R183†**	C2	R242†	D1	R302†	E2	R361†	F3	R420†	H2	R480†	G2	U1	B3
R184†	D3	R243†	D1	R303†	E2	R362†	F3	R421†	H2	R481†	G2	U2	G1
R185†	D3	R244†	D1	R304†	E2	R363†	E3	R422†	H2	R482†	G2	U3	F1
R186†	D3	R245†	E2	R305†	E2	R364†	F3	R423†	H2	R483†**	G2	U4	F1
R187†	D3	R246†	E2	R306†	F1	R365†	F3	R424†	H2	R484†	F3	U5	H1
R188†	D3	R247†	E2	R307†	F1	R366†	F3	R425†	H2	R485†	G3	U6	D1
R189†	C3	R248†	E3	R308†	E1	R367†	E3	R426†	H1	R486†	G3	U7**	C1
R190†	C3	R249†	E3	R309†	E2	R368†	F3	R427†	H1	R487†	F3	U8**	E1
R191†	C3	R250†	D1	R310†	E1	R369†	F3	R428†	G2	R488†	G3	U9	D1
R192†	C3	R251†	D1	R311†	F2	R370†	F3	R429†	G1	R489†	G3	U100	B3
R193†	D3	R252†	D3	R312†	F2	R371†**	F3	R430†	G1	R490†	G3	U101	C3
R194†	C3	R253†	D3	R313†	F2	R372†	F2	R431†	G1	R491†	G1	U102	C3
R195†	D3	R254†	D3	R314†	F2	R373†	F3	R432†	G2	R492†	G3	U103†	C3
R196†**	F4	R255†	D3	R315†	F2	R374†	F2	R433†	G2	R493†	F3	U104	C3
R197†	C2	R256†**	E2	R316†	F2	R375†	G2	R434†	G2	R494†	G3	U105	D2
R198†	C2	R257†**	E3	R317†	F2	R376†	G2	R435†	G2	R495†	F3	U106	D3
R199†	C2	R258†**	D3	R318†	F2	R377†	G2	R436†	G2	R496†**	F4	U200	D3
R200†	D2	R259†	E3	R319†	F2	R378†	G2	R437†	G2	R497†	G2	U201	D3
R201†	D2	R260†	E3	R320†	F2	R379†	G2	R438†**	F4	R498†	G2	U202	D3
R202†	D2	R261†	D3	R321†	F2	R380†	G2	R439†	G1	R499†	G2	U203†	E3
R203†	D2	R262†	D3	R322†	F2	R381†	F2	R440†**	G1	R501†	C1	U204	D3
R204†	D2	R263†	D3	R323†	F2	R382†	F2	R441†	G1	R502†	C1	U300	E3
R205†	D2	R264†	E3	R324†	F1	R383†**	F2	R442†	G1	R503†	C1	U301	F3
R206†	D1	R265†	E3	R325†	F1	R384†	F3	R443†	G1	R504†	C1	U302	F3
R207†	D1	R266†	E3	R326†	F1	R385†	F3	R444†	G1	R505†	C1	U303†	F3
R208†	D1	R267†	D3	R327†	F1	R386†	F3	R445†	H2	R506†	C1	U304	F3
R209†	D2	R268†	D3	R328†	F2	R387†	F3	R446†	H2	R507†	D4	U305	G2
R210†	D1	R269†	D3	R329†	F1	R388†	F3	R447†	H2	R508†	E4	U306	F3
R211†	E2	R270†	D3	R330†	F1	R389†	F3	R448†	H3	R509†	E1	U400	G3
R212†	D2	R271†**	D3	R331†	F1	R390†	F3	R449†	H3	R510†	E1	U401	G3
R213†	D2	R272†	D2	R332†	F2	R391†	F3	R450†	G1	R511†	E1	U402	H3
R214†	E2	R273†	D3	R333†	F2	R392†	F3	R451†	G1	R512†	E1	U403†	G3
R215†	D1	R274†	D3	R334†	F2	R393†	F3	R452†	G3	R513†	E1	U404	G3
R216†	E2	R275†	D3	R335†	F2	R394†	F3	R453†	G3	R514†	E1		
R217†	D2	R276†	D2	R336†	F1	R395†	F3	R454†	G3	R515†	D4		
R218†	E2	R277†	D2	R337†	F2	R396†**	F4	R455†	G3	R516†	E4		
R219†	E2	R278†	D2	R338†**	F4	R397†	F2	R456†**	G2	R517†	F1		
R220†	E2	R280†	D2	R339†	E1	R398†	F2	R457†**	G3	R518†	F1		
R221†	E2	R281†	D2	R340†**	E1	R399†	F2	R458†	G3	R519†	F1		
R222†	E2	R282†	D2	R341†	E1	R400†	G2	R459†	H3	R520†	F1		
R223†	E2	R283†**	D2	R342†	F1	R401†	G2	R460†	G3	R521†	F1		
R224†	E2	R284†	C3	R343†	F1	R402†	G2	R461†	G3	R522†	F1		
R225†	E2	R285†	D3	R344†	F1	R403†	G2	R462†	G3	R523†	D1		
R226†	E1	R286†	D3	R345†	E2	R404†	G2	R463†	G3	R524†	E4		
R227†	E1	R287†	D3	R346†	E2	R405†	G2	R464†	H3	R525†	H1		
R228†	D1	R288†	D3	R347†	E2	R406†	G1	R465†	H3	R526†	H1		
R229†	E1	R289†	D3	R348†	F3	R407†	G1	R466†	H3	R527†	H1		
R230†	E1	R290†	D3	R349†	F3	R408†	G1	R467†	G3	R528†	H1		

\*\* not fitted

# actually a wire link (in a resistor position)

° actually a resistor (in a capacitor position)

^ actually an inductance (in a link position)

^^ actually a wire link (in an inductance position)

† mounted on copper side of PCB

‡ may be mounted on U8 extension PCB (NB: C64 as C5 and C65 as C6, X4 as X1)



# GRID REFERENCES - MODULATOR CIRCUIT DIAGRAM

CAPACITORS		C62	B6	C127	A3	C205	C6	D9	D2	Q16	C5	R95	B2	R216	D2
C1	D6	C65	B5	C128	A3	C206	C6	D10	C5	Q17	D5	R97	B2	R217	B2
C2**	D6	C66	B5	C129	B3	C207	C6	D12	B2	Q18	B5	R98	B2	R218	B6
C3	D6	C67	B5	C131	A3	C208	C6	D13	B2	Q19	D2	R101	B2	R219	C6
C4**	D6	C68	A5	C132	A3	C209	C6	D14	C2	Q20	B2	R102	B2	R220	C6
C5	D5	C69	A5	C133	A3	C210	A3	D15	D3	Q21	C5	R103**	A3	R221	C6
C6	D5	C70	A5	C134	B3	C211	A3	D16	D5	RESISTORS		R104	A3	R222	A3
C7	D5	C71	A5	C137	B2	C212	A3	D17	D5	R1	D6	R105	A3	R223	A3
C8	D5	C72	A5	C138	B2	C213	A3	D18	A5	R2	D5	R106	B3	R224	A3
C9	D5	C73	D3	C139	B2	C214	A3	D19	A5	R4	D5	R109	A2	R225	C3
C10	D5	C74**	D3	C140	B2	C215	A3	D20	A2	R5	D5	R114	A2	R226	C3
C11	D5	C75	D3	C141	B2	C216	C3	D21†	A3	R8	D6	R115	A2	R227	C3
C12	D5	C76**	D3	C142	B3	C217	C3	INDUCTORS		R9	D6	R124	A3	R228	A6
C13	D5	C77	D3	C143	A2	C218	C3	L1	D6	R10	C6	R130	D5	R229	A6
C14	D5	C78	D2	C144	A2	C219	C3	L2	D6	R11**	C6	R132	C5	R230	A6
C15	D5	C79	D2	C145	C5	C220	C3	L3	D5	R12	C6	R136	B5	R231	C2
C16	D6	C80	D2	C147	C6	C221	C3	L7	C6	R13	D6	R140	B2	R232	C2
C17	D6	C81	D2	C148	D3	C222	A6	L8	D5	R16	C5	R141	D2	R233	D2
C18	C6	C82	D2	C151	C5	C223	A6	L9	C5	R17	C5	R142	B2	R234	C5
C19	C6	C83	D2	C155	C6	C224	A6	L10	B6	R21	C5	R143	B2	R235	C5
C20	D6	C84	D2	C156**	C6	C225**	A6	L11	B6	R22	C5	R144	B4	R236	D5
C21	D6	C85	D2	C157	B6	C226	A6	L12	B5	R31	C6	R145	D2	R237	A5
C23	C6	C86	D2	C158	B5	C227	A6	L17	B5	R32	B6	R146	B2	R238	A5
C24	C6	C87	D2	C159	B2	C228	A6	L18	A5	R33	B5	R147	D4	R239	A5
C26	C6	C88	D3	C160	B3	C229	A6	L19	D3	R35	B5	R148	C6	R240	A2
C27	D5	C90	D3	C161	D2	C230	C4	L20	D3	R36	B5	R149	D6	R241	A2
C28	D6	C91	C3	C162	D3	C231	B4	L21	D2	R39	B6	R150	C6	R242	A2
C29	D5	C92	C3	C165	C5	C232	B4	L26	D2	R40	B6	R151	C6	INTEGRATED	
C30	D5	C93	D3	C168	C5	C233	C2	L27	C2	R41**	A6	R152	A6	CIRCUITS	
C31	D5	C95	C3	C169	C5	C234	C3	L28	B3	R42**	A6	R153	C3	U1	D5
C32	D5	C96	C3	C170	C5	C235	D3	L29	B3	R43	A6	R154	A3	U2	C6
C33	D5	C97	D3	C171	C4	C236	C2	L30	B2	R44	B6	R155	C6	U3	B5
C34	D5	C98	D3	C172	B2	C237	C5	L35	B2	R47	A5	R158	A6	U4	A6
C35	C5	C101	D2	C173	B2	C238	C5	L36	A2	R48	A5	R159	B6	U5	D2
C36	C5	C102	D2	C174	B2	C239	D5	L38	C6	R50	C6	R160	A6	U6	C3
C37	B6	C103	D2	C175	D6	C240	C5	L39	B6	R51	C6	R167	A3	U7	B2
C38**	B6	C104	D2	C176	B6	C241	A5	CONNECTORS		R52	A6	R168	B3	U8	A3
C39	B6	C105	D2	C177	D3	C242	A5	PL1	C6	R53	A5	R169	A3	MISCELLANEOUS	
C40**	B6	C106	D2	C178	B3	C243	A5	PL2	C4	R60	C5	R173	D3	COMPONENTS	
C41	B6	C107	C2	C181	C6	C244	A5	PL3	C4	R61	C5	R174	D3	CAN1	D5
C42	B5	C108	C1	C182	C6	C245	A5	PL4	A6	R62	A6	R175	D3	CAN2	B6
C43	B5	C109	B3	C184	C5	C246	A3	TRANSISTORS		R63	D3	R179	C3	CAN3	D2
C44	B5	C110**	B3	C185	D6	C247	A3	Q1	C6	R64	D2	R182	A6	CAN4	B2
C45	B5	C111	B3	C189	D6	C248	A3	Q2	C5	R65	C5	R190	A3	J1	C4
C46	B5	C112**	B3	C190	D6	C249**	D6	Q3	C6	R66	D2	R200	C5		
C47	B5	C113	B3	C191	D6	C250	C4	Q4	A6	R67	D2	R201	C5		
C48	B5	C114	B2	C192	D6	C251	C4	Q5	A5	R68	C5	R202	C5		
C49	B5	C115	B2	C193	D6	C252	C4	Q6	A6	R70	D3	R204	D3		
C50	B5	C116	B2	C194	D6	C253	C4	Q7	C3	R71	D3	R205	B3		
C51	B6	C117	B2	C195	D6	C254	C4	Q8	C2	R72**	C3	R206	D5		
C52	B6	C118	B2	C196	D6	C255	C4	Q9	C3	R73	C3	R207	B5		
C53	A6	C119	B2	C197	D6	C256	C5	Q10	A3	R74	C3	R208	C4		
C54	B6	C120	B2	C198	D6	DIODES		Q11	A2	R75	D3	R209	C4		
C55	A6	C121	B2	C199	D6	D1	D5	Q12	B3	R78	C2	R210	C4		
C56	A6	C122	B2	C200	C6	D3	D5	Q13	C5	R83	C2	R211	D5		
C57	B6	C123	B2	C201	A6	D4	B5	Q15	C5	R84	C2	R212	B5		
C59	A6	C124	B3	C202	C3	D6	A5			R93	C3	R213	B5		
C60	A6	C125	A3	C203	A3	D7	D2			R94	B3	R214	D5		
C61	A6	C126	B3	C204	C6							R215	D2		

\*\* not fitted

° actually a resistor (in a capacitor position)

∞ actually a capacitor (in a resistor position)

† mounted on copper side of PCB

## GRID REFERENCES - MODULATOR PCB

CAPACITORS		C62†	C2	C127†	B2	C205†	C2	D9†	A2	Q16	C1	R95†	B3	R216†	A1
C1†	D1	C65†	C2	C128†	B2	C206†	D2	D10†	B2	Q17	A1	R97†	B2	R217†	A2
C2†**	D1	C66†	D2	C129†	B2	C207†	D2	D12†	A3	Q18	A3	R98†	B2	R218†	A2
C3†	D1	C67†	D2	C131†	B2	C208†	D2	D13	B1	Q19	D1	R101†	B3	R219†	C2
C4†**	D1	C68†	D3	C132†	B2	C209†	D2	D14†	B2	Q20	D2	R102†	B3	R220†	D2
C5†	C1	C69†	D3	C133†	B2	C210†	B2	D15†	B2	Q21	C2	R103†	B2	R221†	D2
C6†	C1	C70†	D3	C134†	B3	C211†	A2	D16†	C2	RESISTORS		R104†	B2	R222†	B2
C7†	C1	C71†	D3	C137†	B3	C212†	B2	D17†	C2			R105†	B2	R223†	B2
C8†	C1	C72†	D3	C138†	A3	C213†	A2	D18†	C3	R1†	D2	R106†	B3	R224†	A2
C9	B1	C73†	A2	C139†	A3	C214†	A2	D19†	C2	R2†	C1	R109†	A2	R225†	A1
C10†	D2	C74†**	A2	C140†	A3	C215†	A2	D20†	B3	R4†	C2	R114†	A3	R226†	B1
C11†	C2	C75†	A2	C141†	A2	C216†	A1	D21†	B3	R5†	C2	R115†	A2	R227†	B1
C12†	C1	C76†**	A2	C142†	A3	C217†	A1	INDUCTORS		R8†	C2	R124†	A2	R228†	D3
C13†	C1	C77†	B2	C143†	A3	C218†	B1			R9†	C1	R130†	C1	R229†	D3
C14†	C2	C78†	B2	C144†	A2	C219†	B1	L1	A1	R10†	C2	R132†	B2	R230†	C3
C15†	C2	C79†	B2	C145†	B2	C220†	B1	L2	A1	R11†	C2	R136†	C2	R231†	B2
C16†	C2	C80†	B2	C147†	B2	C221†	B1	L3	B3	R12†	C2	R140†	B3	R232†	B2
C17†	C2	C81	C2	C148†	B2	C222†	C1	L7	B2	R13†	C1	R141†	B2	R233†	B2
C18†	C2	C82†	A2	C151†	B2	C223†	C1	L8	A2	R16†	C2	R142	A1	R234†	C1
C19†	C2	C83†	B2	C155†	B2	C224†	C3	L9	A2	R17†	C2	R143	B1	R235†	C1
C20†	C2	C84†	B2	C156†**	B2	C225†**	D3	L10	A2	R21†	D1	R144†	D3	R236†	C2
C21†	C1	C85†	B2	C157†	C3	C226†	D3	L11	A2	R22†	D2	R145†	A2	R237†	C2
C23†	C2	C86†	B2	C158†	C2	C227†	D3	L12	B3	R31†	D2	R146†	A2	R238†	C2
C24†	C2	C87†	B2	C159†	B3	C228†	C3	L17	A2	R32†	D2	R147†	D2	R239†	C3
C26†	C1	C88†	B2	C160†	B2	C229†	C3	L18	A2	R33†	C2	R148†	C2	R240†	B3
C27†	C1	C90†	B2	C161†	†B2	C230†	B1	L19	D2	R35†	C3	R149†	C2	R241†	B3
C28†	C2	C91†	B1	C162†	B2	C231†	C1	L20	D2	R36†	C3	R150†	C2	R242†	B3
C29†	C1	C92†	B1	C165†	B2	C232†	C1	L21	C1	R39†	C2	R151†	C1	INTEGRATED CIRCUITS	
C30†	D1	C93†	B1	C168†	B1	C233†	B2	L26	D2	R40†	C2	R152†	C2		
C31†	D2	C95†	B2	C169†	B1	C234†	B2	L27	D2	R41†**	C3	R153†	B2	U1	B1
C32†	D2	C96†	B2	C170†	†B1	C235†	B2	L28	D3	R42†**	C3	R154†	B3	U2†	C2
C33†	D2	C97†	B2	C171†	B1	C236†	B2	L29	D3	R43†	C3	R155†	B2	U3	B2
C34†	D2	C98†	B2	C172	A1	C237†	C1	L30	C2	R44†	C2	R158†	C2	U4†	C3
C35†	D1	C101†	B2	C173	B1	C238†	C1	L35	D2	R47†	C3	R159†	C2	U5	C2
C36†	D2	C102†	A2	C174†	C1	C239†	C2	L36	D2	R48†	C3	R160†	C2	U6†	B1
C37†	D2	C103†	A2	C175	A2	C240†	C2	L38	C2	R50†	B2	R167†	B2	U7	C3
C38†**	D2	C104†	A2	C176	A3	C241†	C2	L39	C2	R51†	B2	R168†	B2	U8†	B2
C39†	D2	C105†	A2	C177	D1	C242†	C2	CONNECTORS		R52†	D2	R169†	B2	MISCELLANEOUS COMPONENTS	
C40†**	D2	C106†	A2	C178	D2	C243†	C3			R53†	D3	R173†	B2		
C41†	C2	C107†	A2	C181†	B2	C244†	C3	PL1	A2	R60†	B2	R174†	B2	CAN1	A1
C42†	C2	C108†	A1	C182†	B2	C245†	B3	PL2	D2	R61†	B1	R175†	B2	CAN2	A3
C43†	C2	C109†	A3	C184†	B2	C246†	B3	PL3	A1	R62†	D3	R179†	A1	CAN3	D1
C44†	C2	C110†**	A3	C185†	C2	C247†	B3	PL4	B1	R63†	A2	R182†	C1	CAN4	D3
C45	B2	C111†	A3	C189	A2	C248†	B2	TRANSISTORS		R64†	B2	R190†	A2	J1	B1
C46†	D2	C112†**	A3	C190	A1	C249†**	A2			R65†	B1	R200†	B2		
C47†	C3	C113†	B3	C191	A1	C250†	B1	Q1†	C2	R66†	B2	R201†	B1		
C48†	C2	C114†	B3	C192†	D2	C251†	B1	Q2	A2	R67†	B1	R202†	B1		
C49†	C2	C115†	B3	C193†	D2	C252†	B1	Q3†	C1	R68†	B1	R204†	B2		
C50†	C3	C116†	B3	C194†	D3	C253†	B1	Q4†	C3	R70†	B2	R205†	B3		
C51†	C3	C117	C3	C195†	D3	C254†	B1	Q5	A3	R71†	B2	R206†	C1		
C52†	C2	C118†	A3	C196†	A1	C255†	B1	Q6†	C2	R72†**	B1	R207†	C2		
C53†	C2	C119†	B3	C197†	A1	C256†	B2	Q7†	B2	R73†	B1	R208†	B1		
C54†	C2	C120†	B3	C198†	A2	DIODES		Q8	D1	R74†	B1	R209†	B1		
C55†	C3	C121†	B3	C199†	A2			Q9†	B2	R75†	B2	R210†	B1		
C56†	C3	C122†	B3	C200†	D2	D1†	C2	Q10†	B2	R78†	A1	R211†	D2		
C57†	C3	C123†	B3	C201†	C3	D3†	D2	Q11	D2	R83†	A2	R212†	D3		
C59†	C3	C124†	B3	C202†	A1	D4†	C3	Q12†	B3	R84†	A1	R213†	D3		
C60†	C3	C125†	B2	C203†	A2	D6†	D3	Q13†	B2	R93†	A1	R214†	D2		
C61†	C2	C126†	B3	C204†	C2	D7†	B2	Q15†	B1	R94†	A3	R215†	A1		

\*\* not fitted

° actually a resistor (in a capacitor position)

∞ actually a capacitor (in a resistor position)

† mounted on copper side of PCB

## MODEL - SPECIFIC INFORMATION

### PARTS UNIQUE TO PACE SMATV UNITS

#### PART Nº 646-8200900 PSM8000/02/ME PAL-G

1OFF	MODULATOR BOARD (NON-EMC) - REV A2	182-0202102
1 OFF	BASE-PSM8000 SMATV UNBRANDED	322-8000121
1 OFF	USER MANUAL-PSM8000 SMATV PACE (ISS 2)	502-8000101
1 OFF	QUICK GUIDE SHEET	504-8001000
R186	15K REPLACED BY SMD 3K3 0.1W 5% M.BOARD	940-3320501
R286	15K REPLACED BY SMD 3K3 0.1W 5% M.BOARD	940-3320501
R386	15K REPLACED BY SMD 3K3 0.1W 5% M.BOARD	940-3320501
R486	15K REPLACED BY SMD 3K3 0.1W 5% M.BOARD	940-3320501
MOD1	BSFC77G51 2GHz S/LNB "F" SW 18/27 TUNER	221-2077041
MOD2	BSFC77G51 2GHz S/LNB "F" SW 18/27 TUNER	221-2077041
MOD3	BSFC77G51 2GHz S/LNB "F" SW 18/27 TUNER	221-2077041
MOD4	BSFC77G51 2GHz S/LNB "F" SW 18/27 TUNER	221-2077041
U4	OTP BOARD (Z8 EXTENSION) EPROM -27256	805-8000001

#### PART Nº 646-8200100 PSM8000/02 PAL-G 'NON-EMC'

1OFF	MODULATOR BOARD (NON-EMC) - REV A2	182-0202102
1 OFF	BASE-PSM8000 SMATV UNBRANDED	322-8000121
1 OFF	QUICK GUIDE SHEET	504-8001000
1 OFF	USER MANUAL-PSM8000 SMATV PACE (ISS 2)	502-8000101
MOD1	BSFC77G51 2GHz S/LNB "F" SW 18/27 TUNER	221-2077041
MOD2	BSFC77G51 2GHz S/LNB "F" SW 18/27 TUNER	221-2077041
MOD3	BSFC77G51 2GHz S/LNB "F" SW 18/27 TUNER	221-2077041
MOD4	BSFC77G51 2GHz S/LNB "F" SW 18/27 TUNER	221-2077041
U4	OTP BOARD (Z8) EPROM -27256	805-8000001

#### PART Nº 646-8010100 PSM8000/10 PAL-I 'NON-EMC'

1OFF	MODULATOR BOARD (EMC) - REV A3	182-0202103
1 OFF	BASE-PSM8000 SMATV UNBRANDED	322-8000121
1 OFF	QUICK GUIDE SHEET	504-8001000
1 OFF	USER MANUAL-PSM8000 SMATV PACE (ISS 2)	502-8000101
MOD1	BSFC77G39 2GHz S/LNB "F" SW 18/27 TUNER	221-2077391
MOD2	BSFC77G39 2GHz S/LNB "F" SW 18/27 TUNER	221-2077391
MOD3	BSFC77G39 2GHz S/LNB "F" SW 18/27 TUNER	221-2077391
MOD4	BSFC77G39 2GHz S/LNB "F" SW 18/27 TUNER	221-2077391
U4	OTP BOARD (Z8) EPROM -27256	805-8000001

#### PART Nº 646-8200400 PSM8000/22 PAL-K 'NON-EMC'

1OFF	MODULATOR BOARD (NON-EMC) - REV A2	182-0202102
1 OFF	BASE-PSM8000 SMATV UNBRANDED	322-8000121
1 OFF	USER MANUAL-PSM8000 SMATV PACE (ISS 2)	502-8000101
1 OFF	QUICK GUIDE SHEET	504-8001000
C13	180PF REPL. BY SMD 120PF 50V 5% M/BOARD	950-1215501
C49	180PF REPL. BY SMD 120PF 50V 5% M/BOARD	950-1215501
C85	180PF REPL. BY SMD 120PF 50V 5% M/BOARD	950-1215501
C121	180PF REPL. BY SMD 120PF 50V 5% M/BOARD	950-1215501
MOD1	BSFC77G51 2GHz S/LNB "F" SW 18/27 TUNER	221-2077041
MOD2	BSFC77G51 2GHz S/LNB "F" SW 18/27 TUNER	221-2077041
MOD3	BSFC77G51 2GHz S/LNB "F" SW 18/27 TUNER	221-2077041
MOD4	BSFC77G51 2GHz S/LNB "F" SW 18/27 TUNER	221-2077041
U4	OTP BOARD (Z8 EXTENSION) EPROM -27256	805-8000001

#### PART Nº 646-8200101 PSM8000/02 PAL-G 'EMC'

1OFF	MODULATOR BOARD (EMC) - REV A3	182-0202103
1 OFF	BASE-PSM8000 SMATV UNBRANDED	322-8000121
1 OFF	QUICK GUIDE SHEET	504-8001000
1 OFF	USER MANUAL-PSM8000 SMATV PACE (ISS 2)	502-8000101
MOD1	BSFC77G51 2GHz S/LNB "F" SW 18/27 TUNER	221-2077041
MOD2	BSFC77G51 2GHz S/LNB "F" SW 18/27 TUNER	221-2077041
MOD3	BSFC77G51 2GHz S/LNB "F" SW 18/27 TUNER	221-2077041
MOD4	BSFC77G51 2GHz S/LNB "F" SW 18/27 TUNER	221-2077041
U4	OTP BOARD (Z8) EPROM -27256	805-8000001

## LATE CHANGES

- As from 1.12.93 (ECO S000332) base and cover are up issued to use leathergrain paint finish.
- As from 22.11.93 (ECO S000329) SCART sockets SK100, SK200, SK300 and SK400 — MFK6341 (NO LUGS) type are replaced by JR21A7 PINR/ANGLE types.

## Other Changes

- As from 31.8.93 (ECO S000284) to prevent intermittent failure of modulators to power up and excessive current when powered up. Four 47k 0.25W resistors are retrofitted between the metal screening can and the RF input of SP5511S on the pcb underside. To reduce excess current R211, R212, R215 and R217 zerohm link replaced by 470R.
- As from the 9.8.93 (ECO S272) the EMC modulator board is modified to improve output power and flatness optimisation. Component values changed are R9, R40, R71, R102 from 3k3 to 2k7, R149, R159, R174, R169 from 75R to 47R, R148, R150, R158, R160, R173, R175, R167, R169 from 470R to 680R and capacitor C254 from 6.8pf to 12pf.
- As from the 23.7.93 (ECO S263) the EMC compatible modulator board is added, modulator pcb identification suffix of E onwards have EMC compatibility.
- As from 7.9.93 (ECO S000291) to increase audio level to equal terrestrial transmission standard, the amplifier gain was increased, R193, R293, R393 and R493 values were changed to 6k8 from 5k1.
- As from 31.8.93 (ECO S000286) to improve Panda frequency response and limiting at peak deviation. The following component values were changed. Receiver 1 (Rx -1) R186, R191, R193 and C166, Rx - 2 R286, R291, R293 and C266, Rx - 3 R386, R391, R393 and C366, Rx - 4 R486, R491, R493 and C466 were increased in value from 3k3 to 15k, 4k7 to 1k2, 1k8 to 5k1 and 10nF to 15nF respectively.
- As from 17.8.93 (ECO S000275) to prevent audio clicking on all inputs the phase detector output was modified. C246 was increased in value from 100nF to 470nF and a retrofitted capacitor of the same value was added in parallel.
- As from the 2.7.93 (ECO S246) the mod wires have been increased to a new length as per work instruction PD9-180-C.
- As from 1.7.93 (ECO S000244) the base is updated to improve production and efficiency.
- As from 23.6.93 (ECO S000248) to reduce earth leakage R20 and C9 'Y' class component values were changed from 4M7 to 10M and from 4n7 to 1nF.
- As from 23.6.93 (ECO S000247) to improve the audio deviation on modulated RF carriers the gain of the amplifier stage was increased, the values of R193, R293, R393 and R493 were changed to 1k8 $\Omega$  from 1k $\Omega$  and R46 was changed to 4k3 $\Omega$  from 1k8 $\Omega$ .
- As from 14.6.93 (PCO S000088) four spacer washers are added behind panel.
- As from 7.6.93 (ECO S000235) audio de-emphasis set for 75 $\mu$ s and a modification for pre-emphasis mismatch, components C166, C266, C366 and C466 value changed from 15nF to 10nF and four retrofitted 47nF 50V 10% Cer X7R Cap 0805 capacitors added in parallel with R194, R294, R394 and R494. To enable modulators to tune to 5.5MHz for PAL I and PAL G the values of C13, C49, C85 and C121 are changed from 150pf to 180pf.
- As from 20.5.93 (ECO S000219) a diode type BYW98-50 is mounted in parallel with D14 reducing component heat dissipation.
- As from 14.5.93 (ECO S000204) the SMATV is upgraded to A3 from A2 revision. Component J1 phono socket with new cable assembly and five 1nF capacitors added C230, C231, C232 and C234.

## IMPORTANT

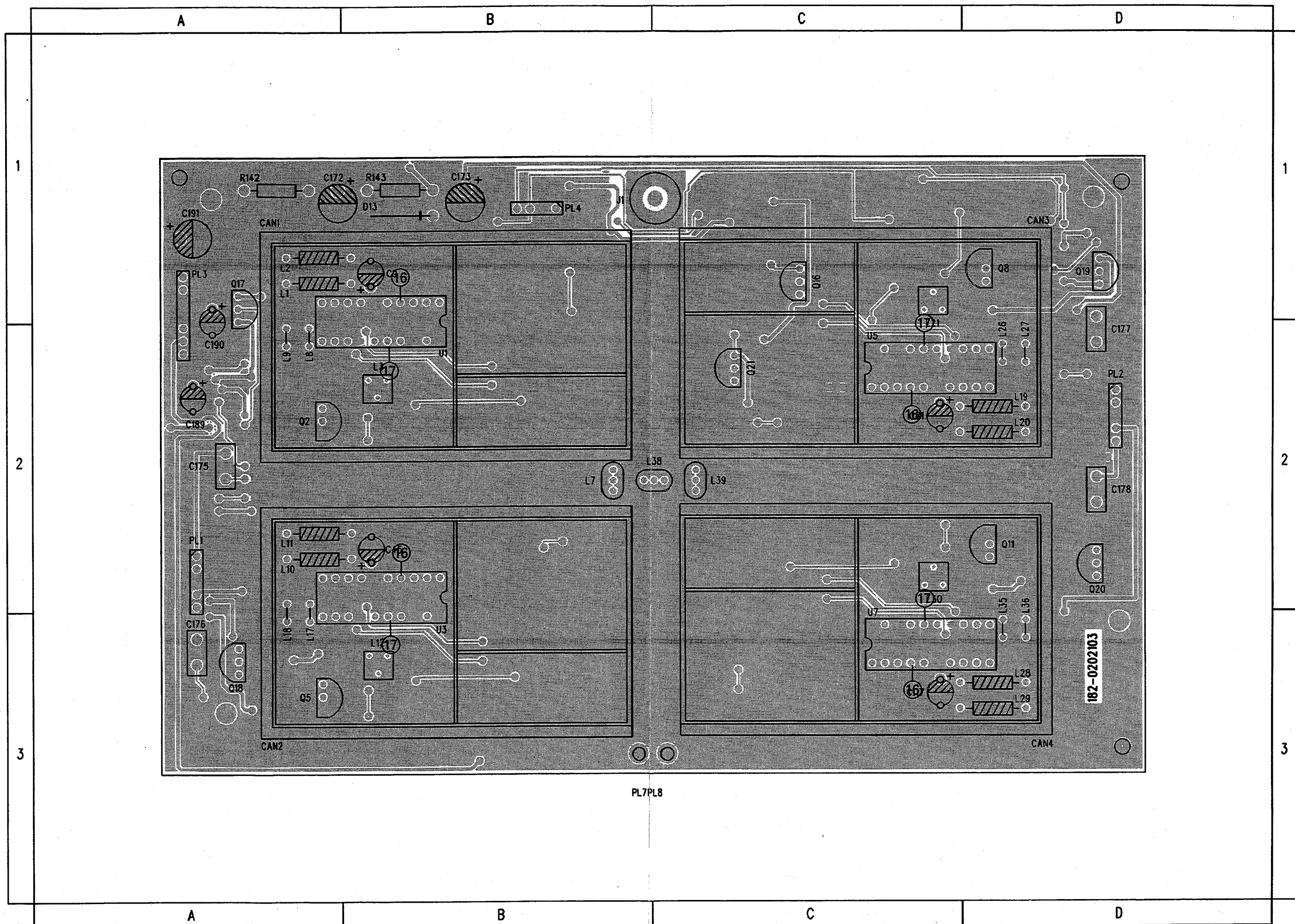
### NOTE 1: STATUS OF THE PRODUCT

The main PCB described in this manual is at Revision A1. The PCB's part number is marked on the component side of the PCB. This number can be read in area H3 of the component ident diagram in this manual, where revision A1 is denoted by the characters 101 at the end of the part number.

This manual includes information from all Engineering Change Orders (ECOs) and Production Change Orders (PCOs) up to and including ECO S000332 provided that these had an effectivity date on or before 1.12.93. All ECO/PCO's which had an effectivity date after 1.12.93 are not included in the main pages of this manual but may be included in the Late Changes section (see above).







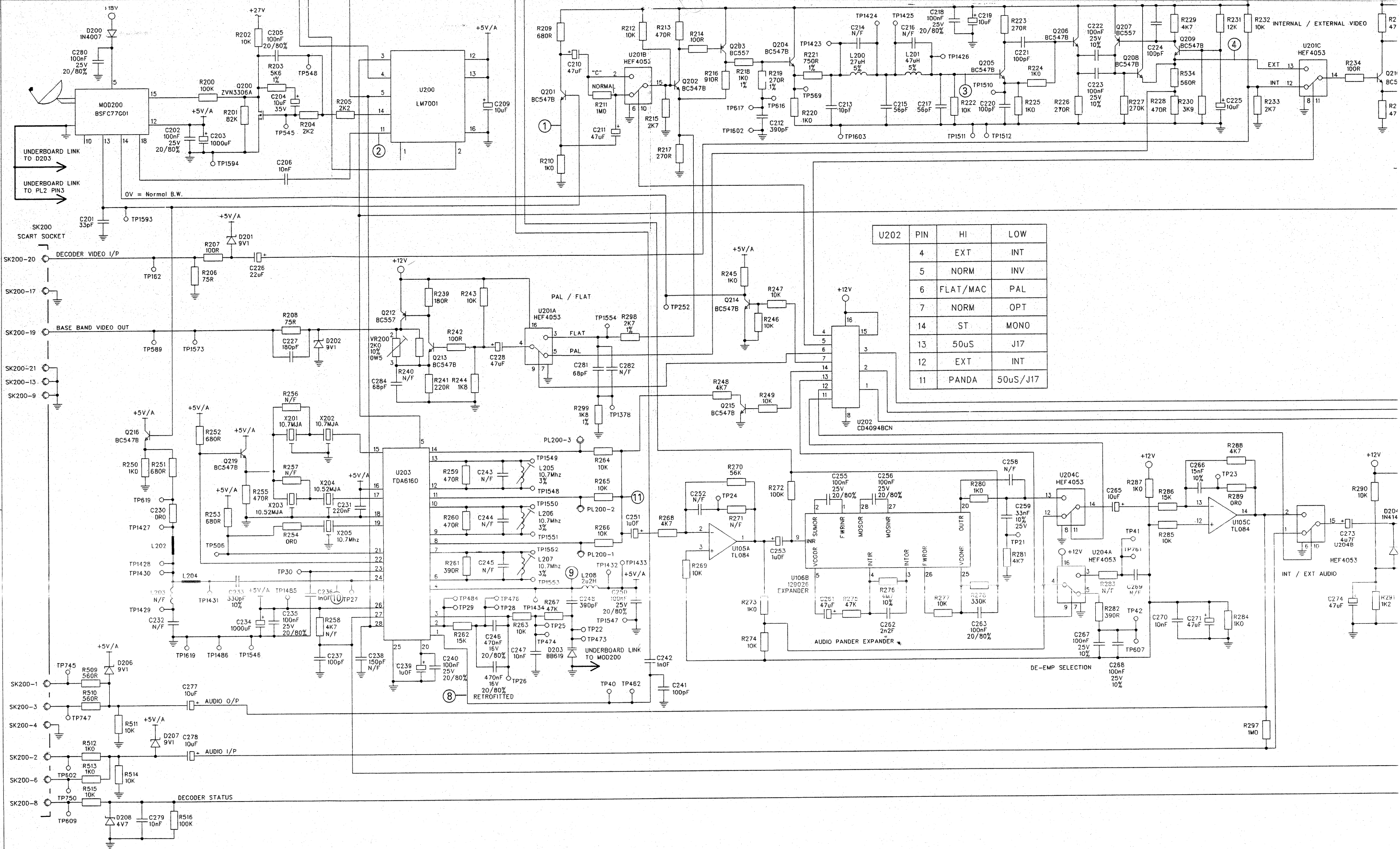




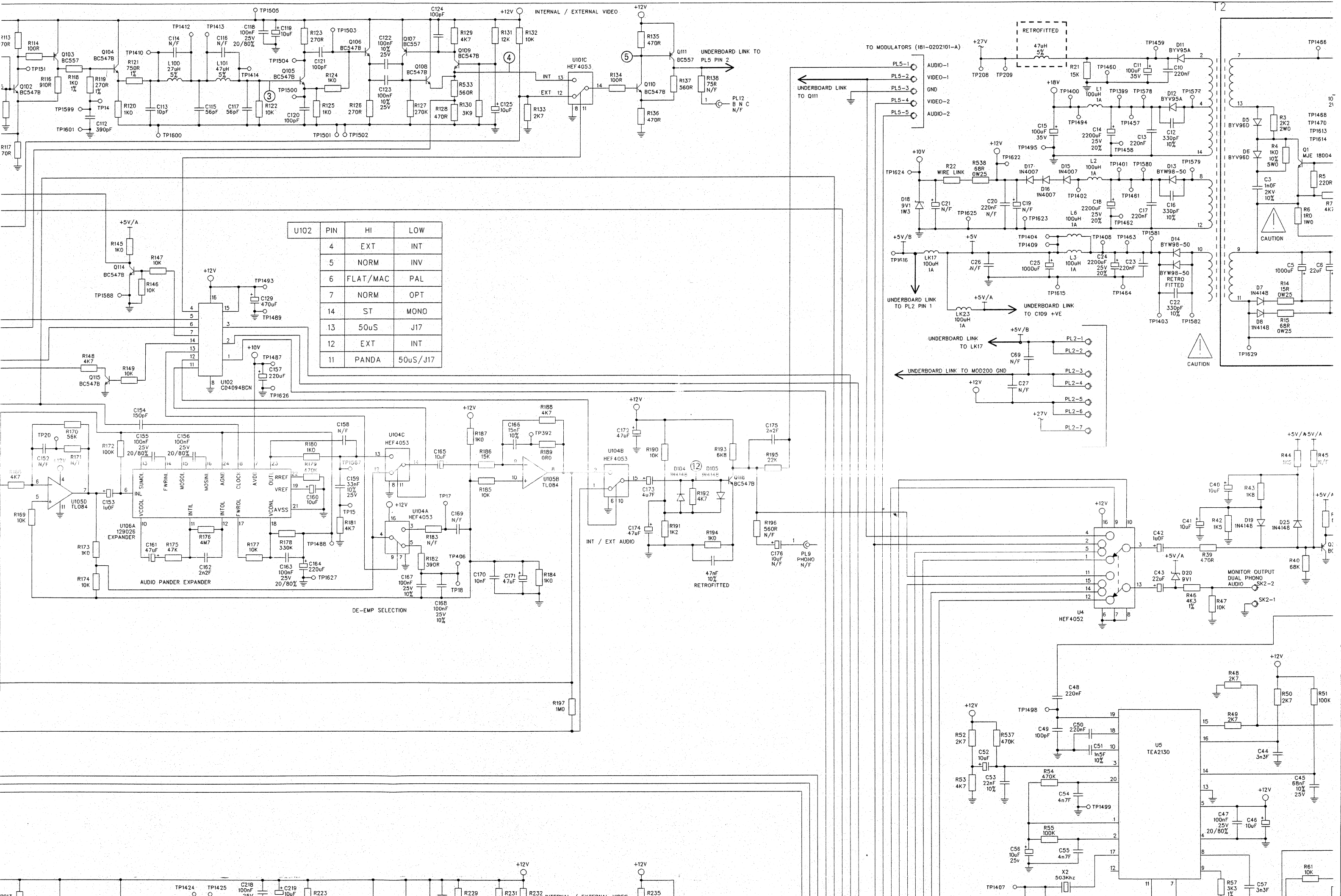
1

B

A

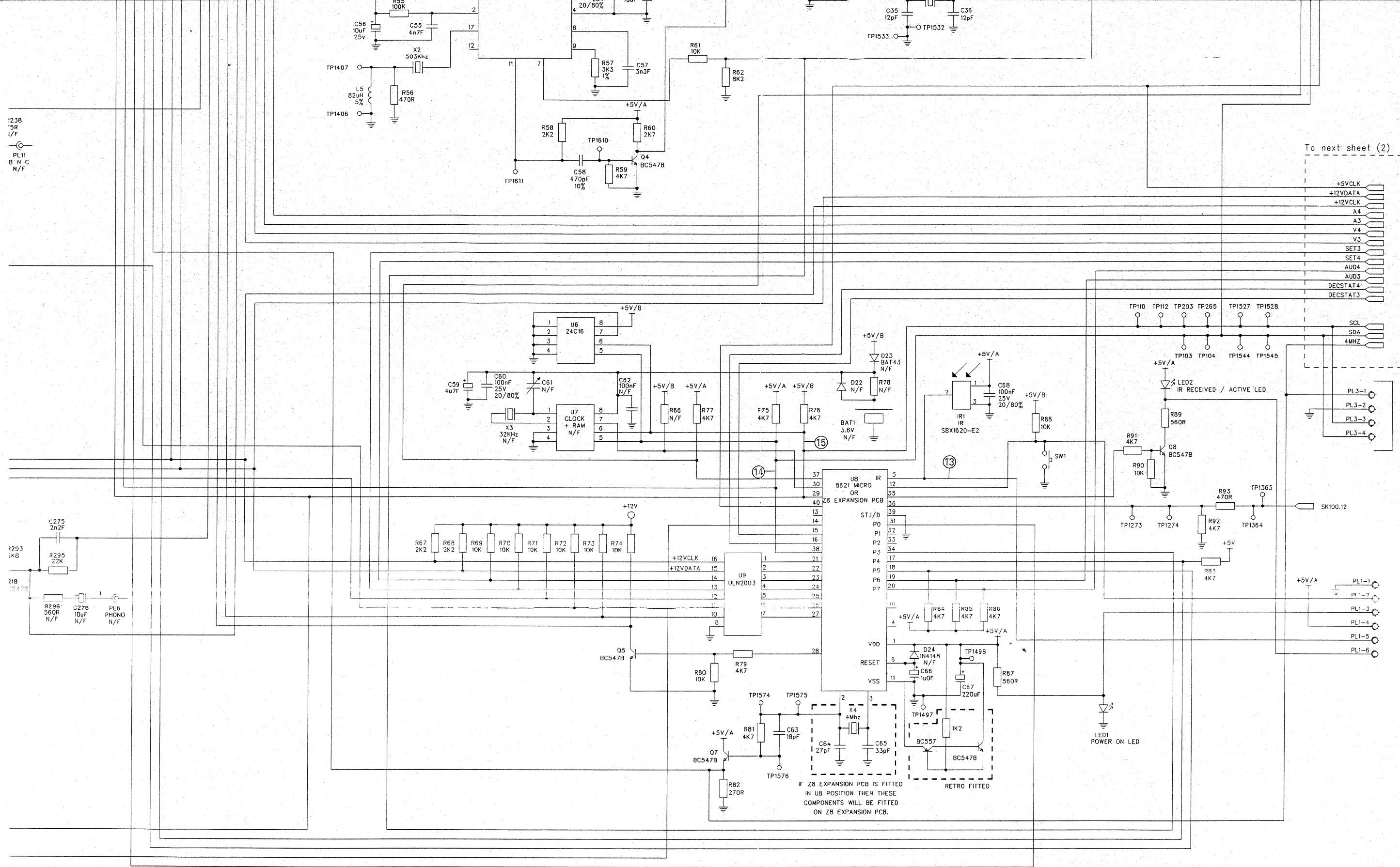












2

B

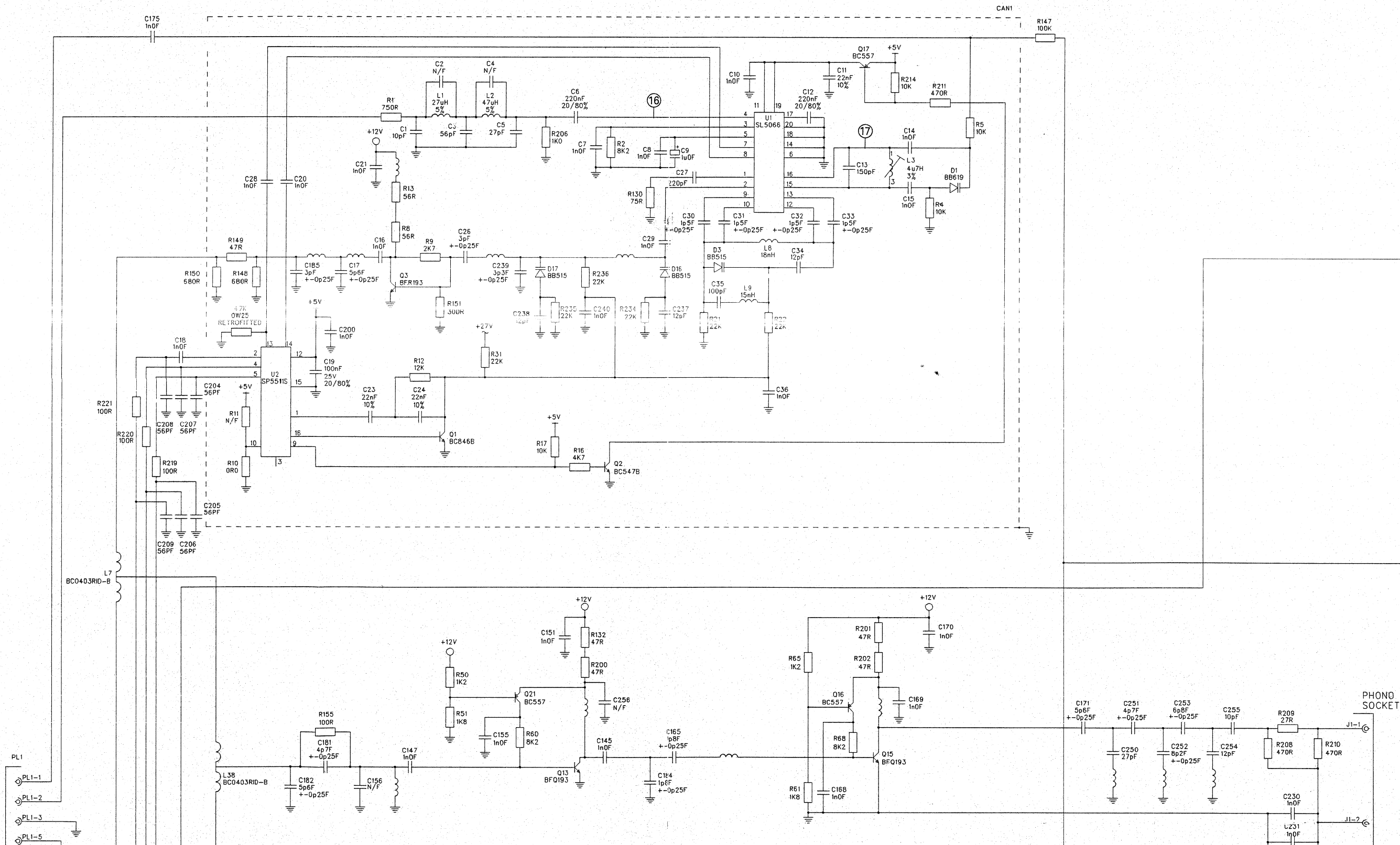
A

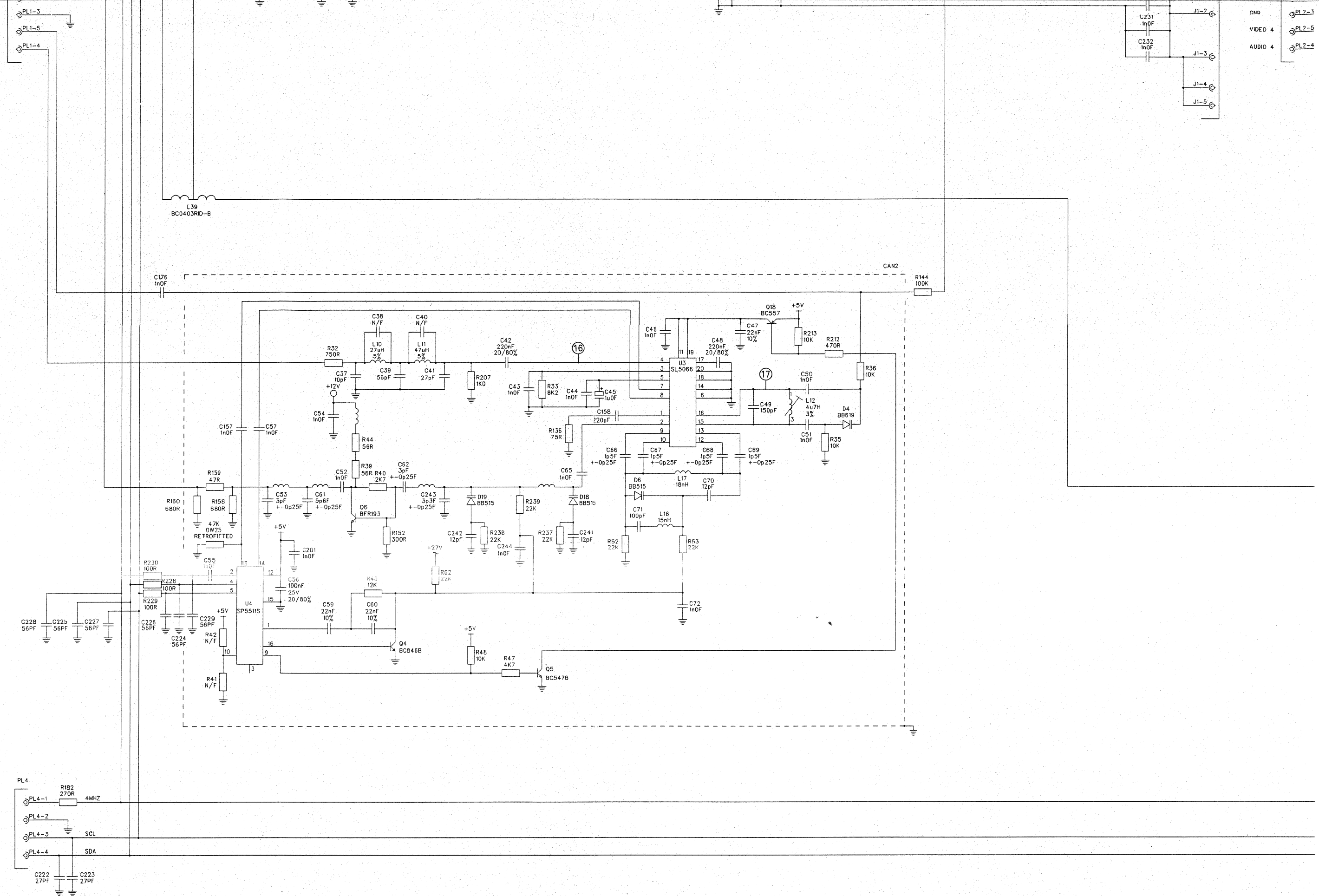
CHIP PINS U8	PIN	PORT Q	PIN	PORT 1	PIN	PORT 2	PIN	PORT 3
0	13		21	12V CLK	31	DEC STAT 1	5	IR I/P
1	14	DEC STAT 2	22	12V DATA	32		39	
2	15	DEC STAT 3	23	SET 4	33		12	IR INHIBIT
3	16	DEC STAT 4	24	SET 3	34	STATION ID	30	TIMER
4	17	AUD 1	25	SET 2	35	IRLED	29	SCL
5	18	AUD 2	26	SET 1	36	TESTER I/P - O/P	10	
6	19	AUD 3	27	MONSEL 1	37	GRAPHICS CE	40	+5VCLK
7	20	AUD 4	28	MONSEL 2	38	SDA	4	
NIBBLE PROG		BYTE PROG		BIT PROG		4 I/P + 4 O/P		

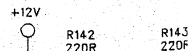
CHANNEL	12V	12V	L	L
CHANNEL 1	12V	12V	L	L
CHANNEL 2	12V	0V	L	H
CHANNEL 3	0V	12V	H	L
CHANNEL 4	0V	0V	H	H

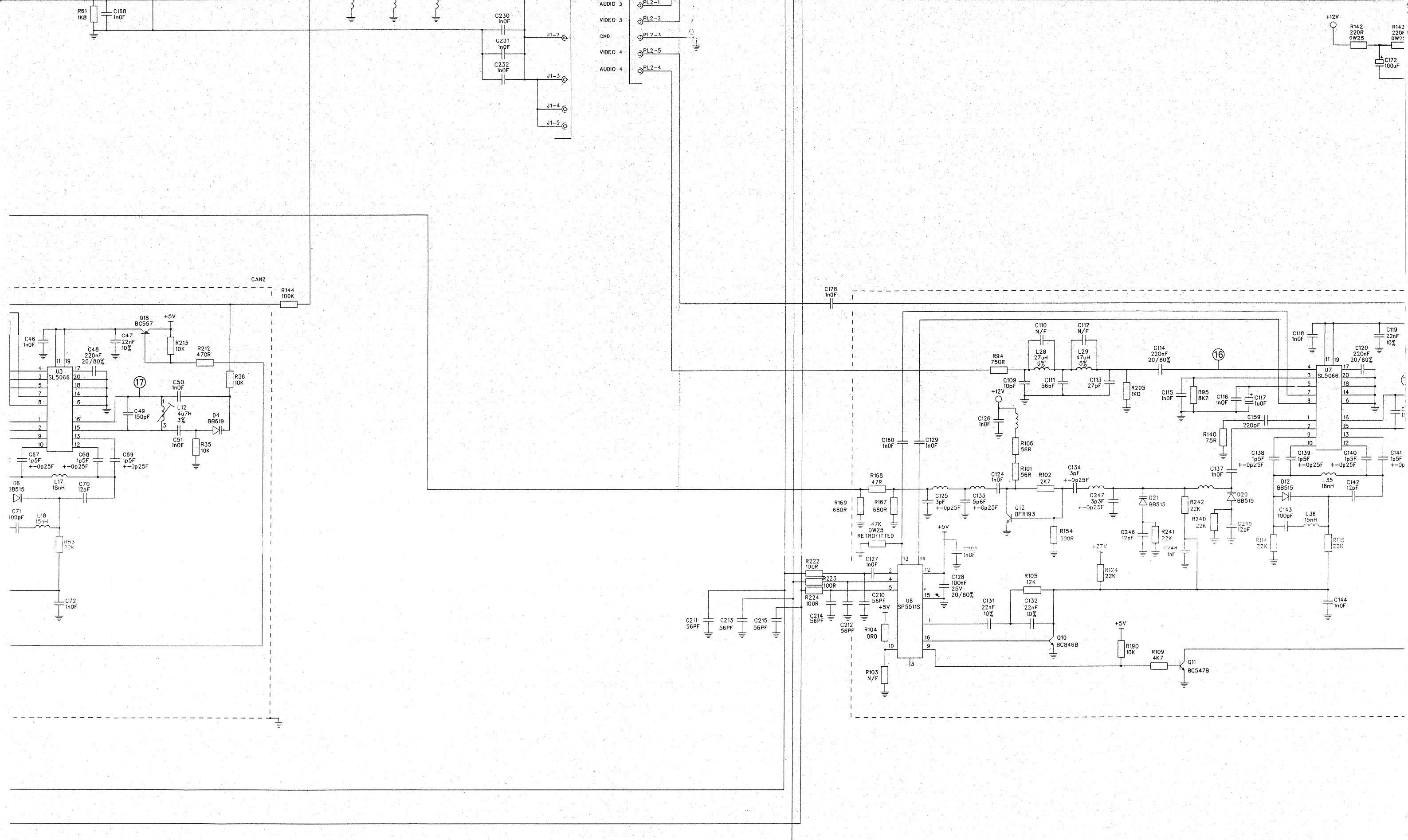
0805 Resistors are 5% 0W1 unless otherwise stated.  
 0805 Capacitors are 50V 5% unless otherwise stated.  
 Electrolytic Capacitors are 16V unless otherwise stated.  
 Zener Diodes are 5% 400mW unless otherwise stated.  
 = Not Fitted.











NOTE:  
 All 0805 Resistors  
 All 0805 Capacitors  
 All Electrolytic Capacitors  
 N/F = Not Fitted  
 Inductors without values

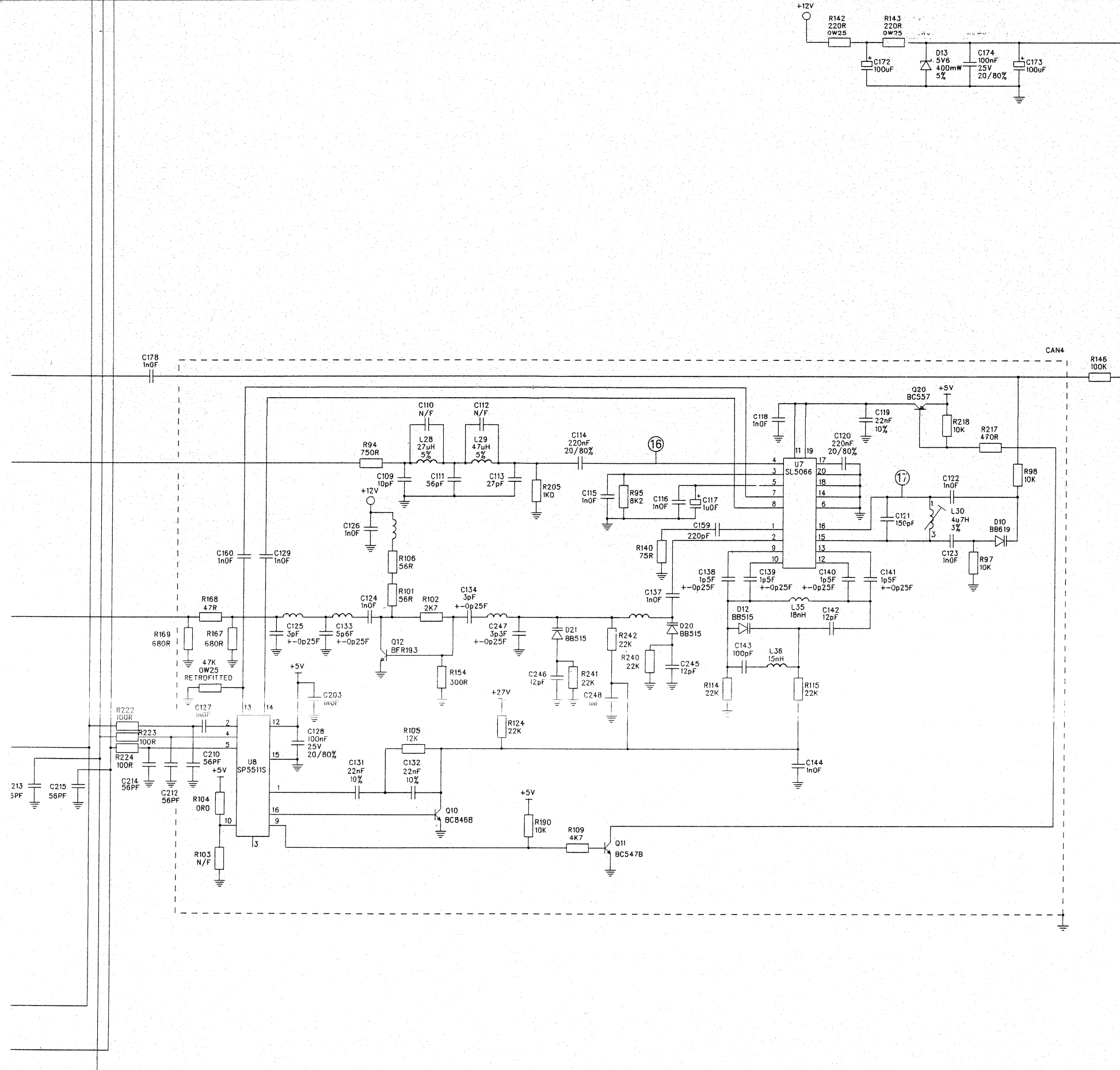




4

B

A

**NOTE**

All 0805 Resistors are 01W 5% unless otherwise stated.

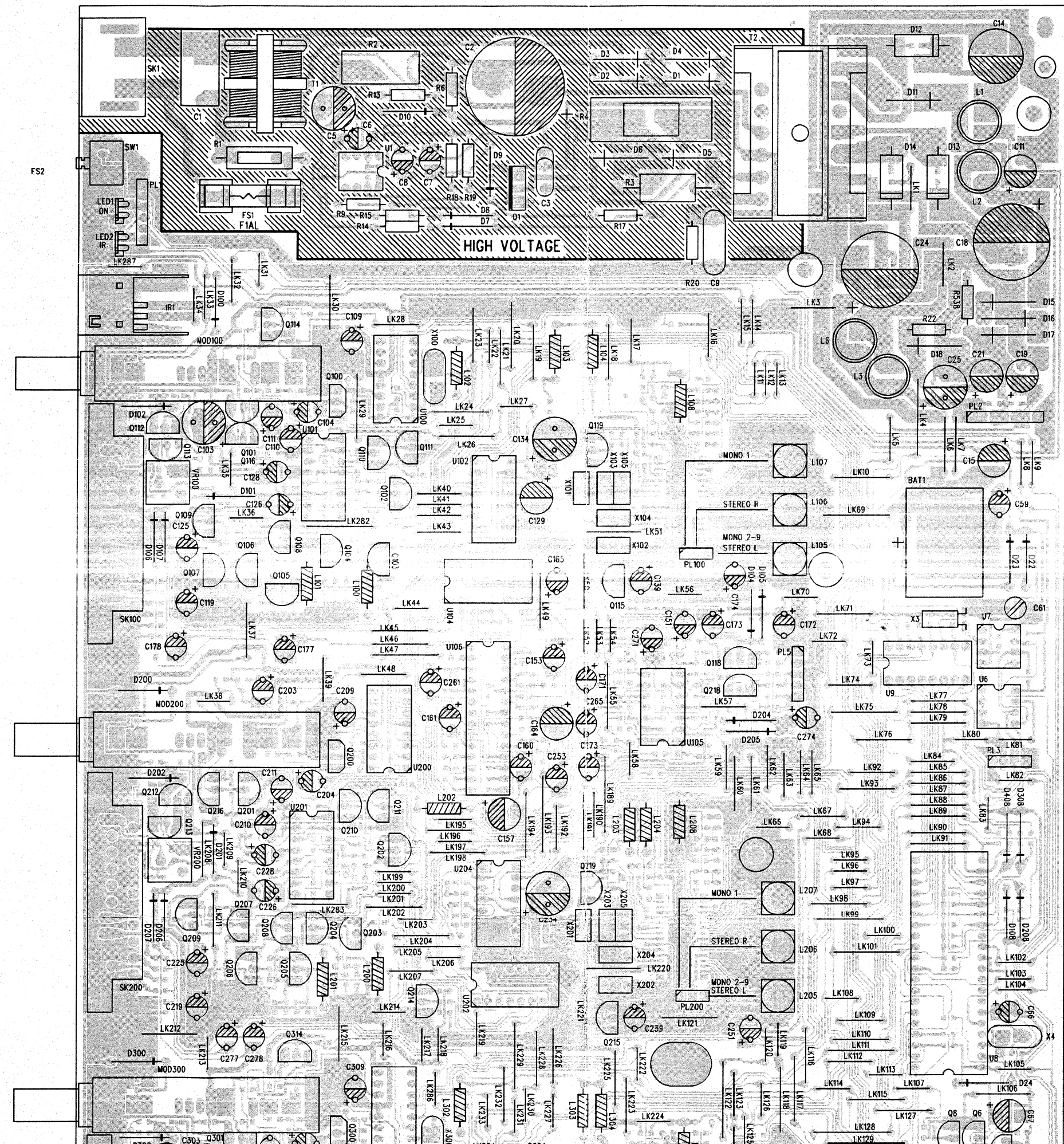
All 0805 Capacitors are 50V 5% unless otherwise stated.

All Electrolytic Capacitors are 16V unless otherwise stated.

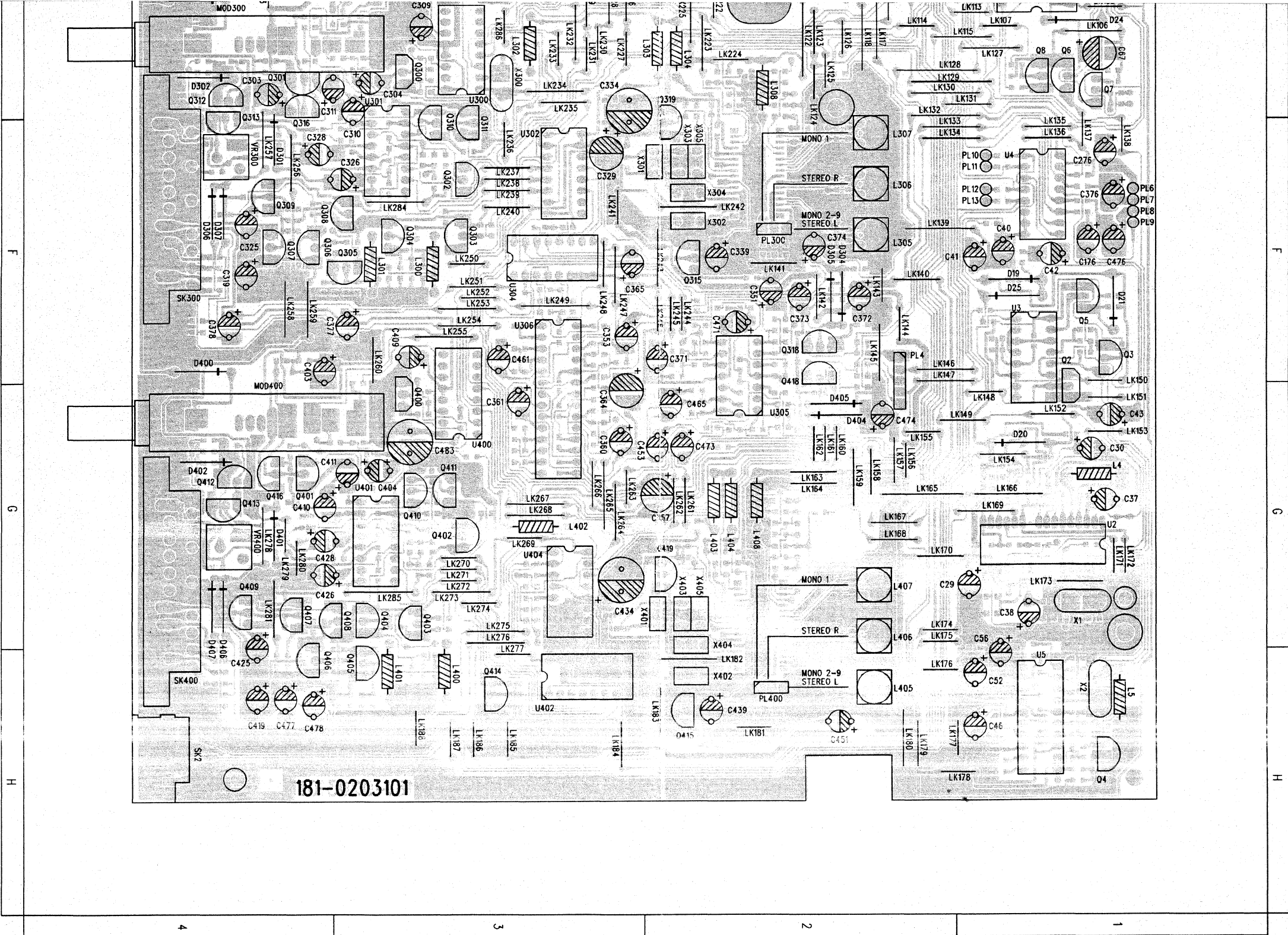
N/F = Not Fitted.

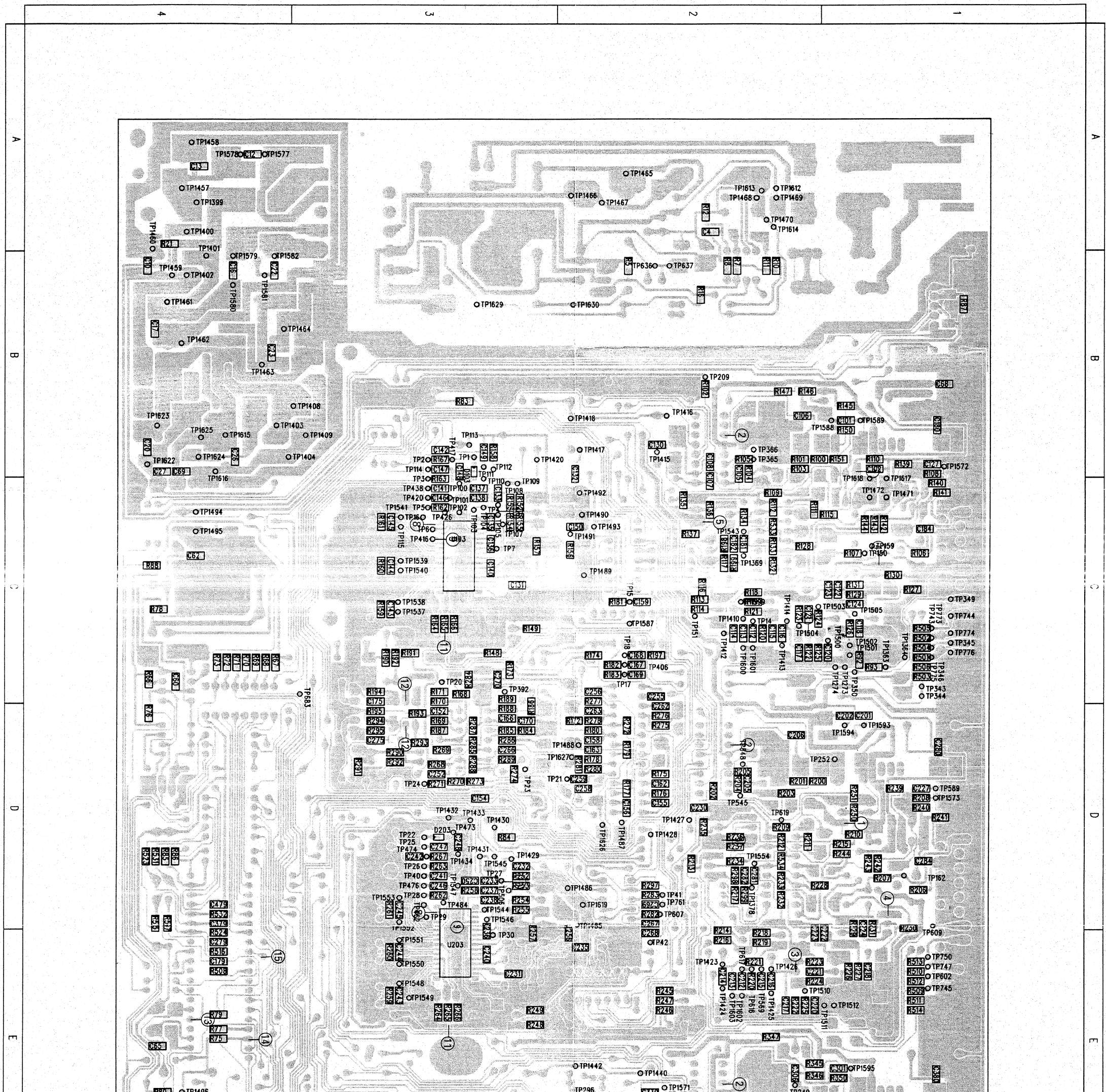
Inductors without Circuit References are printed as part of PCB design.

A  
B  
C  
D  
E



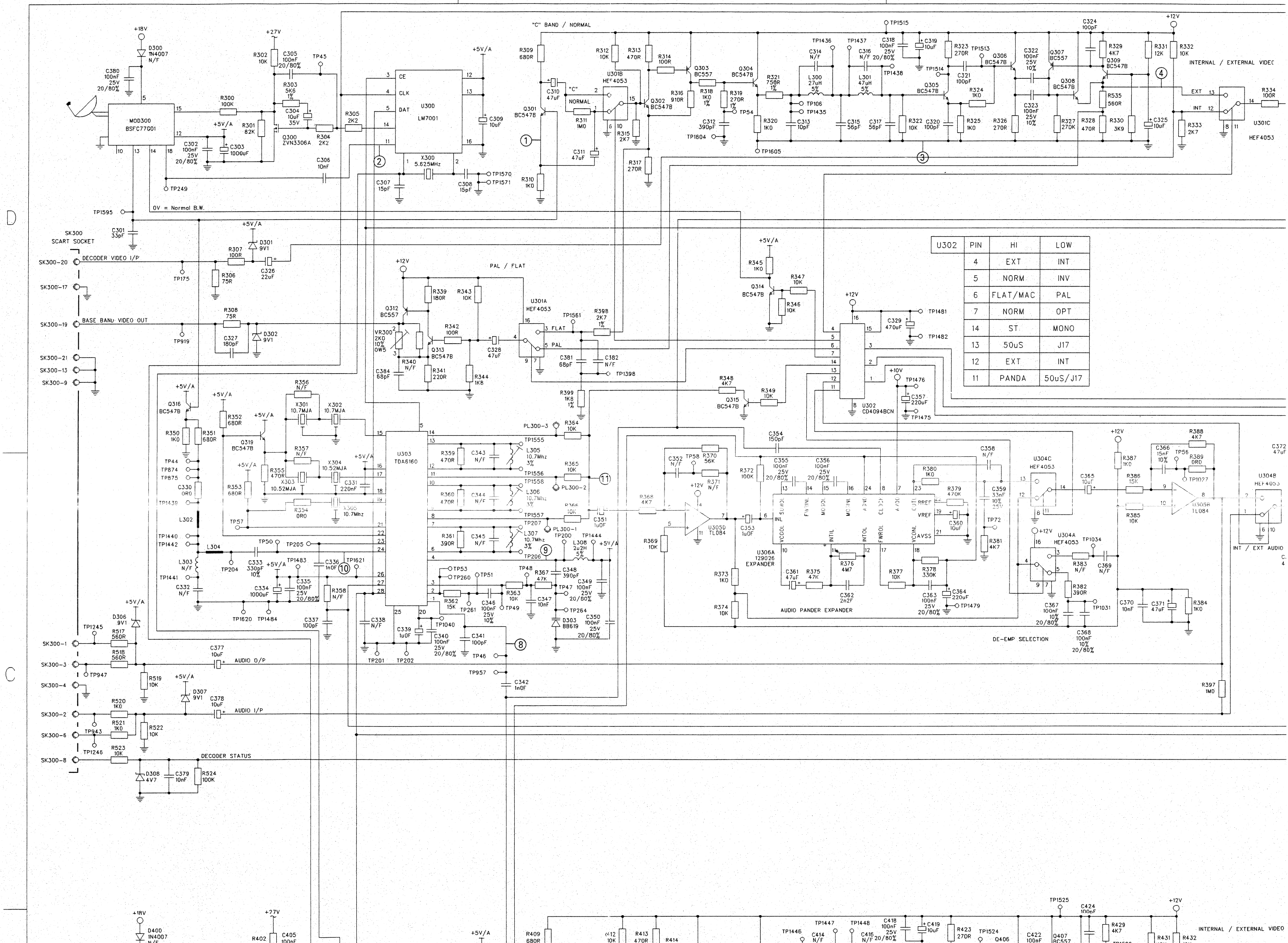


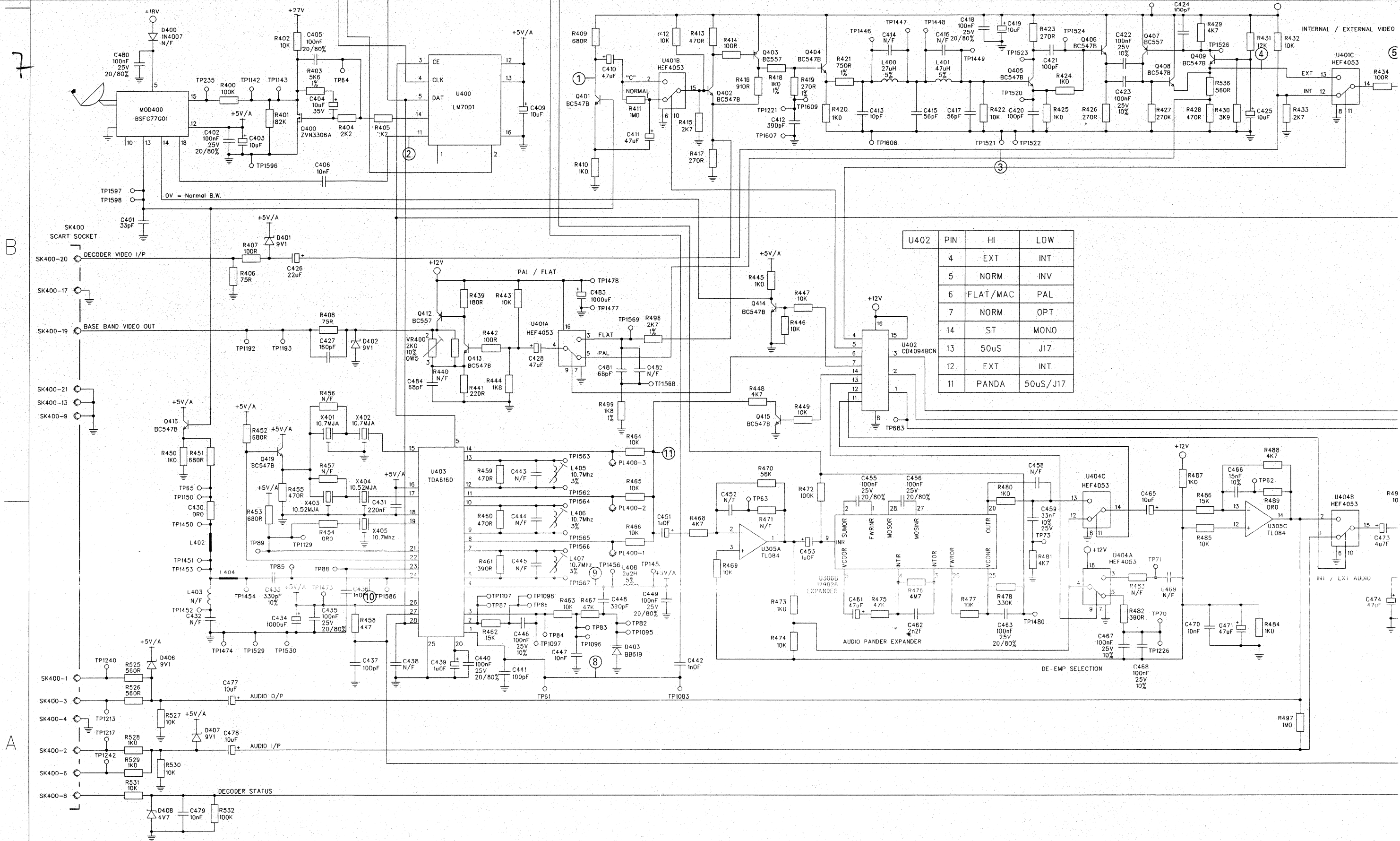




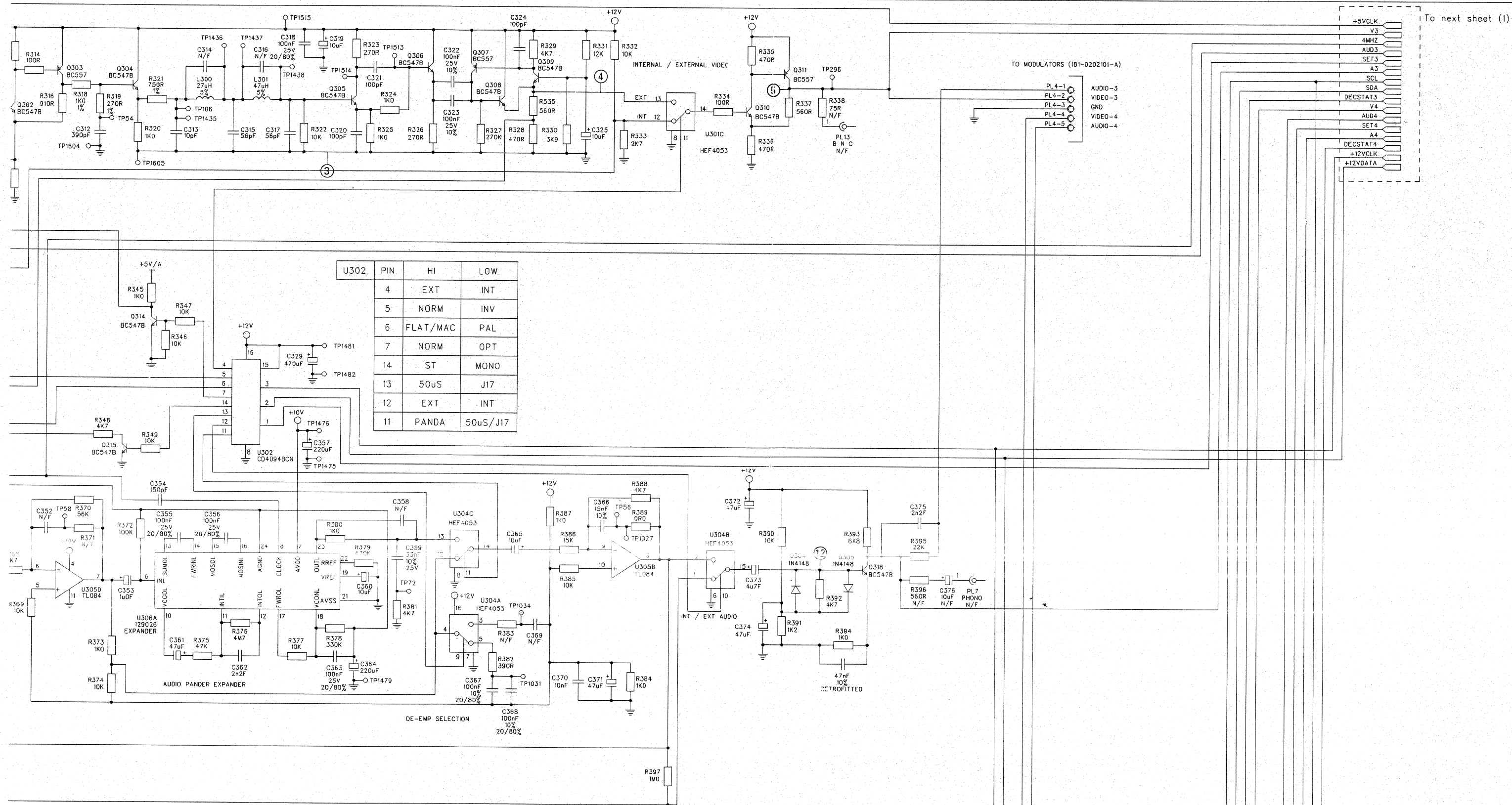


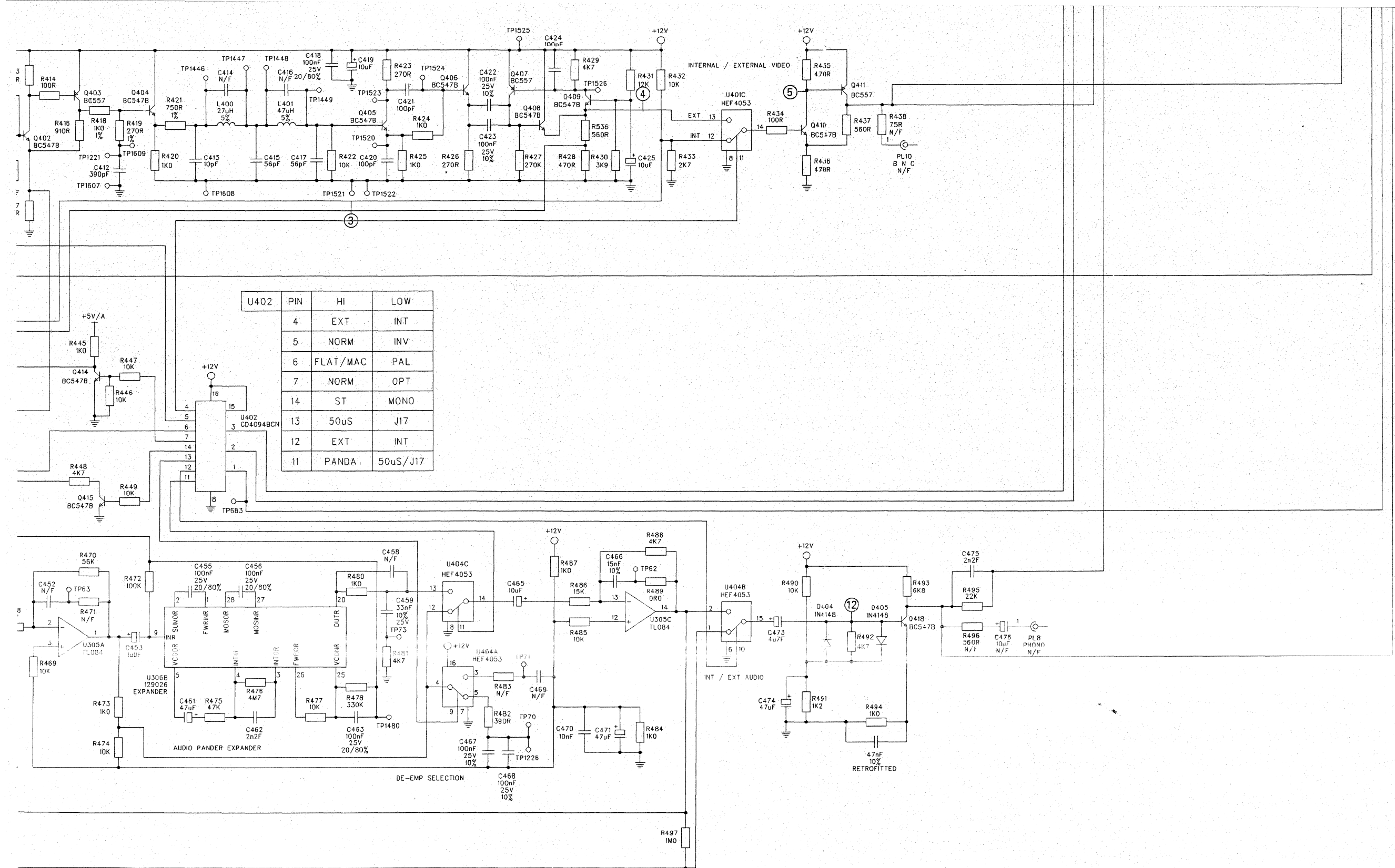












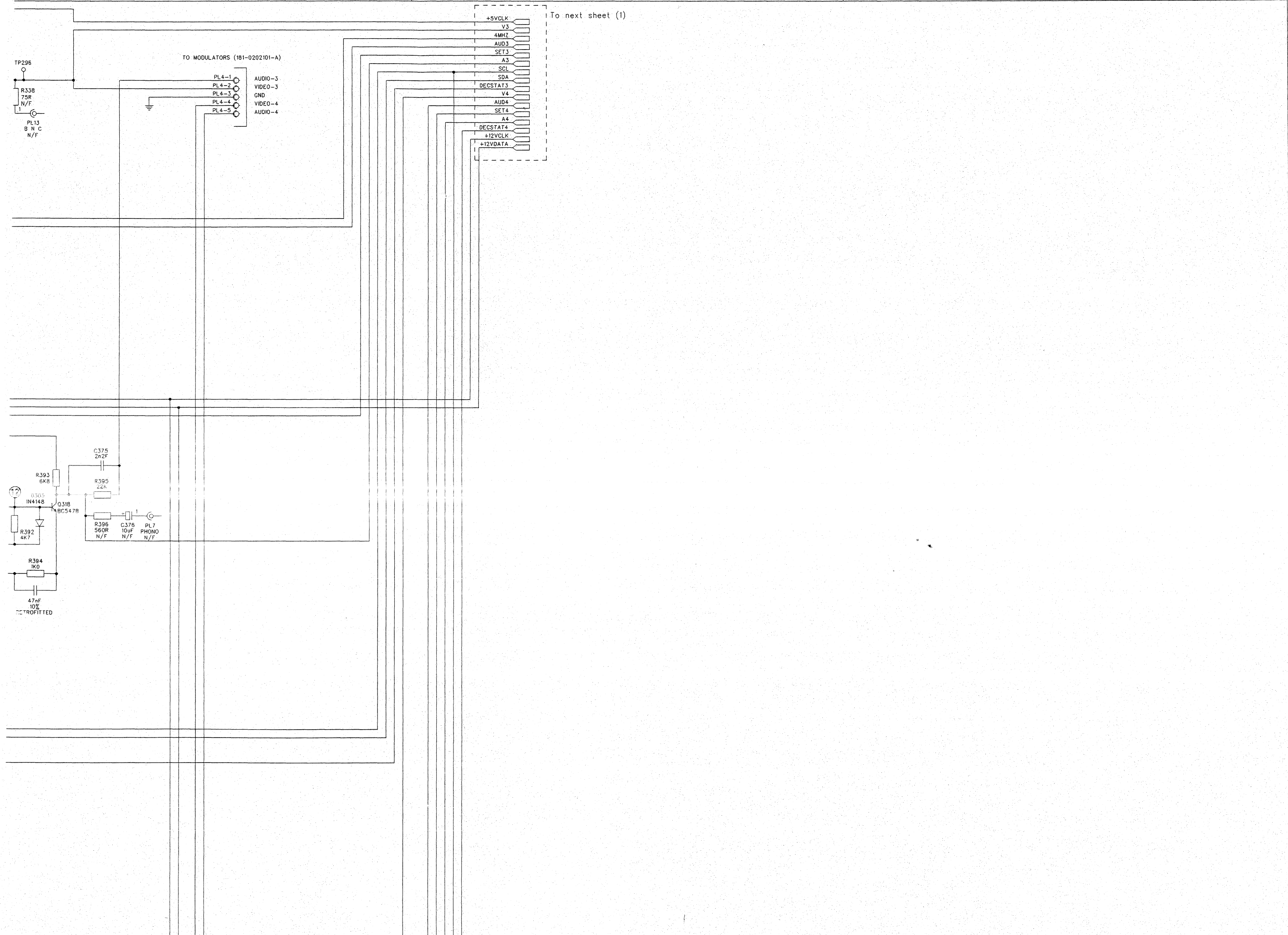
3

2

1

D

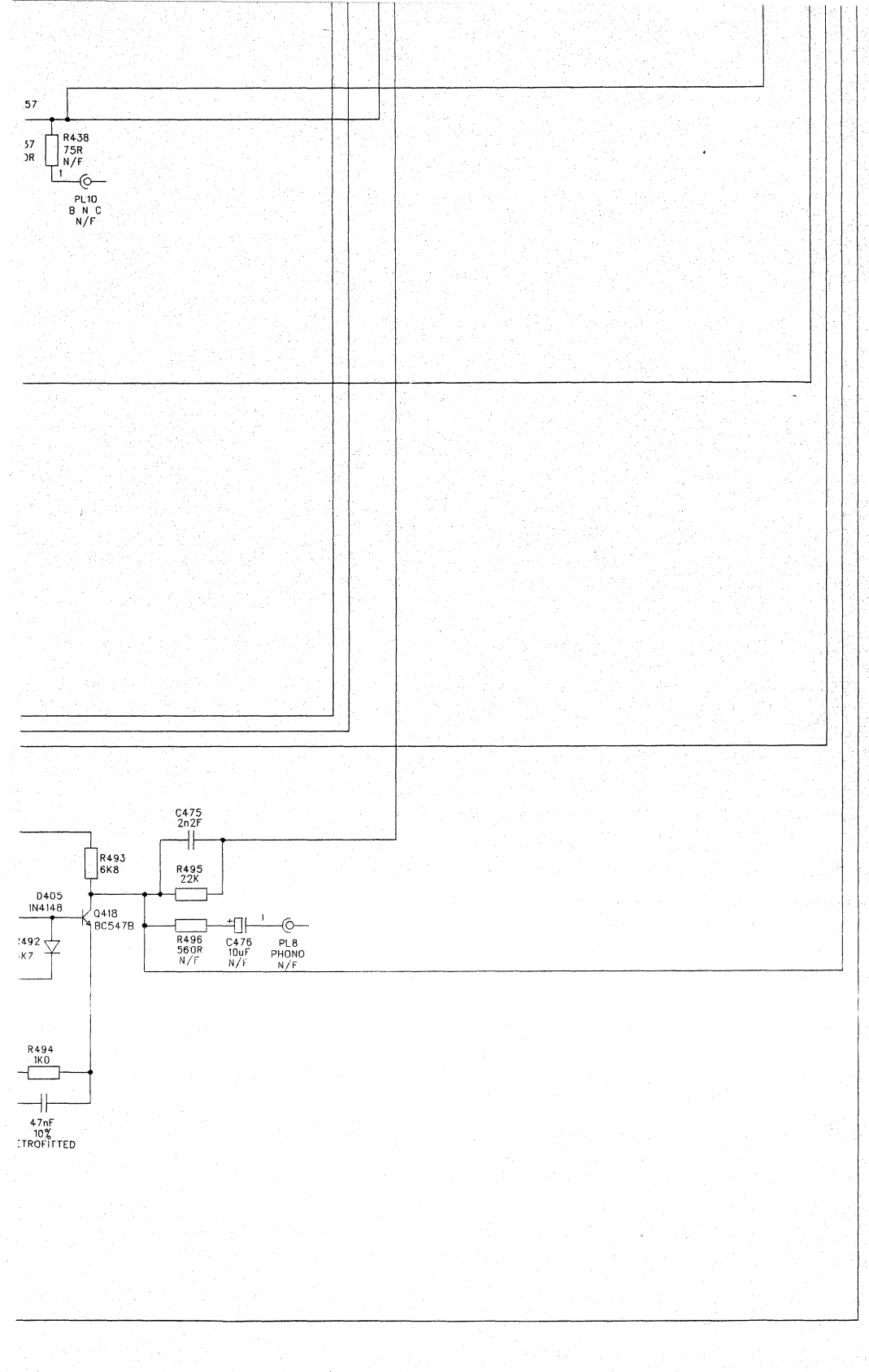
C



8

B

A



NOTE

All 0805 Resistors are 5% 0W1 unless otherwise stated.  
 All 0805 Capacitors are 50V 5% unless otherwise stated.  
 All Electrolytic Capacitors are 16V unless otherwise stated.  
 All Zener Diodes are 5% 400mW unless otherwise stated.  
 N/F = Not Fitted.